IN THIS SET

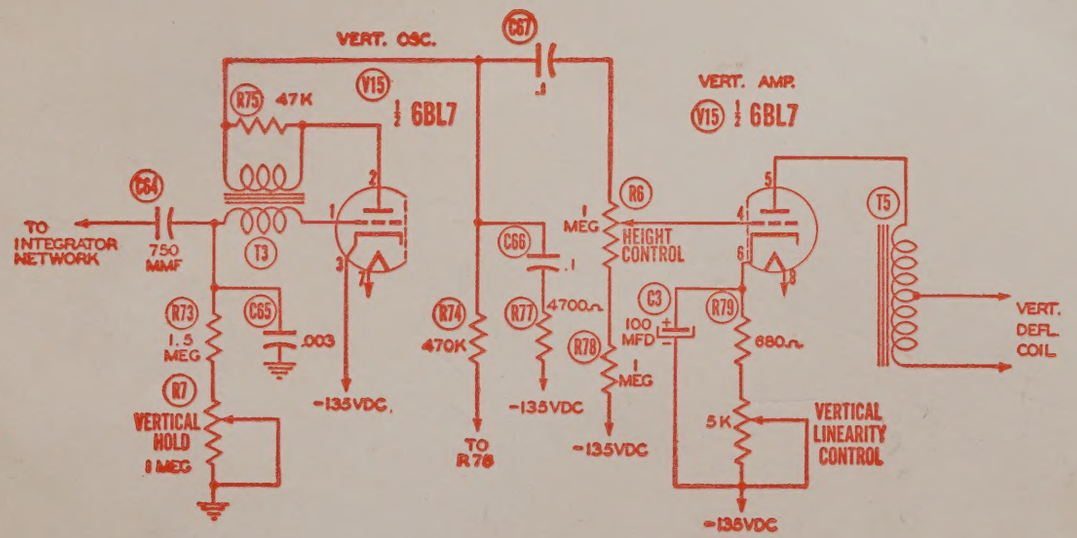
PHOTOFACT TELEVISION FOLDERS

COVERING

HALLICRAFTERS, RAYTHEON, SENTINEL, SYLVANIA, AND TELE-TONE RECEIVERS

VERTICAL OSCILLATOR AND VERTICAL OUTPUT CIRCUIT.

SEE SYLVANIA MODEL 4120M, FOLDER No. 10.



COMING

SET No. 125—Photofact Folders on Andrea, Emerson, General Electric, Philco and Tele-Tone Television Receivers.

PUBLISHED BY HOWARD W. SAMS & CO., INC. INDIANAPOLIS 5, INDIANA

PHOTOFACT* FOLDER SET

*TRADE MARK

NO. 124

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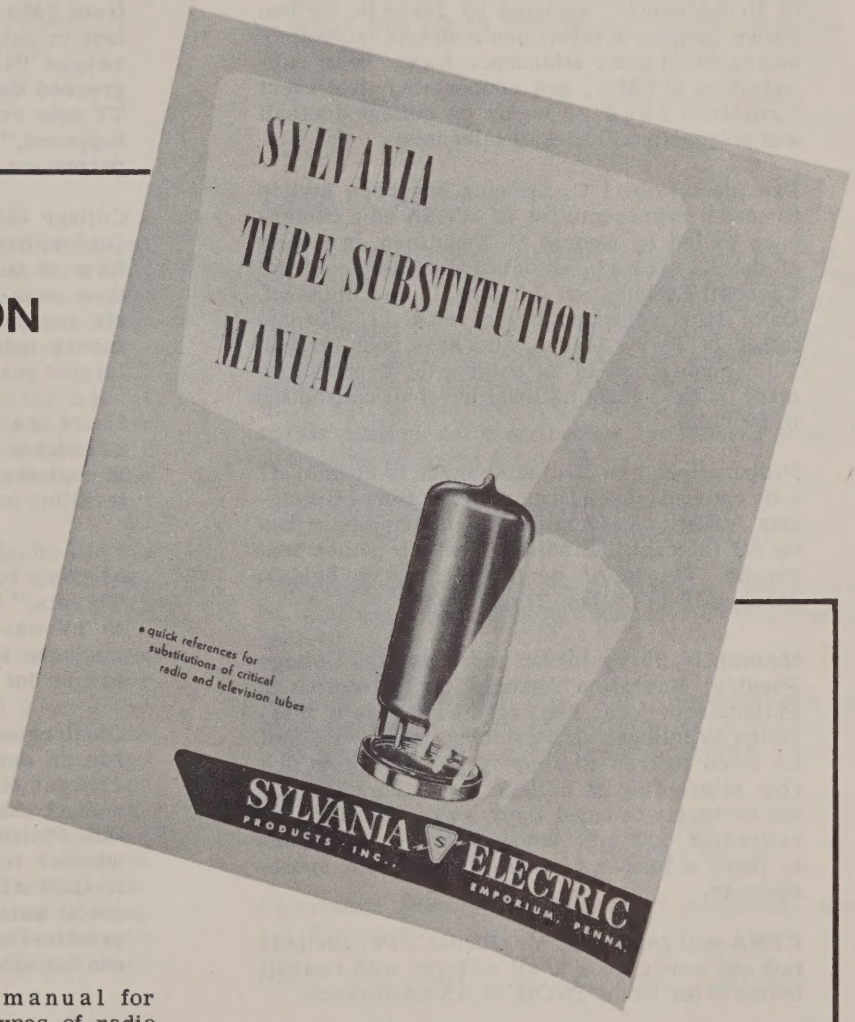
The PHOTOFACT Servicer

February 15, 1951 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ Volume 13, Nos. 123 & 124

TUBE SUBSTITUTION MANUAL

Available Free from Sylvania



A new 40-page tube substitution manual for quick reference for substitute types of radio and television tubes is available free on request. Write to the Advertising Department, Sylvania Electric Products Inc., Emporium, Pennsylvania, and mention the PHOTOFACT Servicer.

The manual is arranged in nine sections providing informative text and charts on general tube classifications; circuit modifications in which additional resistors are needed; substitute battery type tubes; substitute 150 ma tube types; substitute 300 ma tube types; substitute transformer and auto tube types; substitute TV receiving type tubes; substitute TV picture tube types; and frequently needed change-over diagrams.

Types of tubes classified in the manual include; remote cutoff RF amplifiers; sharp cutoff RF amplifiers; converters; diode detectors; diode-pentodes; diode triode detector-amplifiers; indicators; multi-purpose tubes; duo-triodes; power amplifiers; general purpose rectifiers including voltage doublers; high voltage rectifiers for TV; gas triode and tetrode relays; horizontal TV scanners; vertical TV scanners; high voltage single and duo-triode oscillators; general purpose triodes; and special purpose tubes.

TELEVISION SPORTS BAN

We believe that the following release by the Radio-Television Manufacturers Association, in their bulletin of December 29th, is worth while reading for anyone engaged in the Television Industry. We feel that it would be particularly beneficial if individual service technicians see that possible sponsors of television programs in their locality be aware of the figures and findings expressed in this article.

We appreciate the courtesy of RTMA in extending permission for us to reproduce the quoted material:

> Officials of RTMA and the National Association of Broadcasters, assisted by Jerry N. Jordan, whose studies of television's effects on football and baseball game attendance have been published by RTMA, are cooperating to prevent threatened bans or curbs on college football and professional baseball telecasts.
>
> President Robert C. Sprague has been invited to send a representative of RTMA to a conference called by George M. Trautman, president of the National Association of Professional Baseball Leagues, on January 15 in Columbus, Ohio. NAB representatives and C. L. Jordan, father of Jerry Jordan, also have been invited. The conference is an outgrowth of proposals made at the recent national baseball convention in Florida.
>
> Preparations also are being made to counteract a threatened resolution of the National Collegiate Athletic Association recommending a ban on all telecasts of college football games next season. The NCAA conference will be held on January 16 in Dallas, Texas.
>
> Meanwhile, Jerry Jordan addressed the College Physical Education Association convention in Philadelphia today and urged wider use of television by colleges as a public relations medium. He cited figures to support his contention that the telecasting of college football games had not seriously reduced their gate receipts and reiterated that only among new TV set owners is there a tendency to stay away from sports contests.
>
> RTMA will reproduce Mr. Jordan's Philadelphia talk and send copies to all colleges with football teams prior to the Dallas NCAA conference.
>
> Television has not hurt newspapers, magazines, radio, entertainment or sports attendance to the extent many people predicted, Mr. Jordan said in his Philadelphia talk.
>
> "All of these industries," he said, "are operating at or very close to the highest levels in their history, despite the fact that 1950 was the dangerous novelty period in the development of television."
>
> The young analyst defined 1950 as a peak danger period in the effect of television. "All of our studies," he said, "have shown that the greatest harm to reading, outside entertainment and sports attendance comes during the first year of ownership. After that, the novelty and cost wear off and normal habits tend to return in many homes."
>
> In Mr. Jordan's opinion, there probably never will be another period with such a large group of owners of less than a year. Television set sales, he estimated, would drop in 1951 as a combined result of national defense restrictions, and the FCC freeze on new TV markets. "Even if the industry could produce and sell another six million sets," he said, "the majority of owners would be out of the novelty stage when television hurts most."
>
> Turning to sports, Mr. Jordan presented figures from 1950 baseball attendance to show that the loss in paid admissions per game in Major League Parks decreased as the season progressed despite the installation of 600,000 new TV sets every month. "This would not have happened," he said, "if TV's harm had been permanent."
>
> College football attendance, according to Mr. Jordan, has had the best record of any major form of outside entertainment, hitting its all-time peak in 1949, and even if it is off between six and seven per cent, as the United Press survey indicates, it will still have the second largest year in its history.
>
> Six of the fourteen smaller colleges increased attendance in 1950 over 1949, despite decline in students, bad weather, and general economic levelling out.
>
> "51% of all the families and probably three out of every four football fans in this area now own TV sets," he said, estimating that the loss due to TV was not more than 6%. "Even this loss might be temporary as most of the families will be out of the novelty stage in 1951."
>
> Challenging the idea of imposing a national TV ban on any individual locality unless the local colleges themselves want it, he said: "It just doesn't make sense to force a national ban on this Philadelphia Area now and never find out whether television will be helpful or harmful to football after the novelty has worn off. The public wants to know the actual facts from practical experience - not opinion. Philadelphia can furnish these facts in 1951."

* * *

HERE'S WHERE YOU CAN HELP -

Joseph B. Elliott, Vice-President in charge of RCA Victor Consumer Products, in an address before the National Appliance and Radio Dealers Association, on January 15th, said:

> "Go over service costs to make sure store-operated service is profitable and sound. If it is not, farm it out to dependable service contractors."

That is mighty good advice - - BUT you have to do your part. Let the dealers in your locality know you do good work and that you ARE dependable.

RESONANT PAPER TUBULARS FOR IMPROVED IF FILTERING

The Aerovox Corporation, New Bedford, Mass., has announced the addition of a new line of resonant capacitors for use in receivers employing IF systems between 425 and 485 kilocycles.

These capacitors, type RC, are available in the following standard ratings: .05, .1 and .2 mfd., 400 WVDC; measuring 1/2" d. x 1-1/8", 1/2" d. x 1-5/8", and 9/16" d. x 1-7/8", respectively.

* * *

CORRESPONDENCE OF INTEREST NEGATIVE GHOST PROBLEM

Mr. R. D. Meade
3034 Albany Crescent
New York 63, New York

Dear Mr. Meade:

Your letter of December 9 has been forwarded to me for review by the Howard W. Sams & Co., Inc. In this letter you state you have the problem of a strong negative ghost appearing to the left of your regular Channel 2 signal.

I agree with you that orientation of the antenna will not help this condition, as the antenna is not at fault. This is unusual in the fact that a leading signal is usually positive rather than negative.

In actual practices there are very few cases similar to it. I suggest that you try the following remedies:

1. More likely than not, your transmission line is unshielded, and is of the proper length to pick up the Channel 2 signal far stronger than the antenna, due to the fact that the antenna is designed for mid-band frequencies and does not pick up the higher and lower extremity signals (that is, Channels 13 and 2) as strong as it picks up those channels in the center of the television spectrum. Attempt to vary the length of the transmission line by adding or subtracting three to six feet to it. This might unbalance the transmission line sufficiently to reduce the ghost pickup.

2. If the above remedy does not prove satisfactory, try using a shielded line from the antenna to the receiver.

3. We have conducted tests on sets that utilize "inset" or "built-in" antennas; and, in most cases, they can cause reflections into the tuner even though it is disconnected from the antenna terminals. Try removing the inset antenna completely from the cabinet.

4. In many cases too strong a signal at the antenna will cause "ringing" in the RF section of the set. This is especially true if the RF bandpass has been reduced to obtain maximum signal from the tuner through peaking the RF coils. If an attenuator pad does not cut down the other channels too much, it will remedy the ringing of the tuner. You should also check to see if the Channel 2 coils are not peaked to too great a degree.

   Off hand I would say that this would be the least likely trouble to expect, and would not attempt working on the tuner until all of the above mentioned remedies had been attempted.

If none of these solutions work for you, please feel free to write me further on the subject, and I will try to analyze the specific problem for you.

Donald A. Nelson

* * *

FIELD EXPERIENCES -

For every "Field Experience" published, we issue a certificate good for one PHOTOFACT Folder Set. Awards are issued at the time of publication. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Co., Inc.

RCA Models 2T51 and 2T60
Photofact Set No. 111, Folder No. 11

Complaint: Reception on low channels, but inoperative on high channels. Coupling condenser C-14 270 mmf. shorted.

Remedy: Remove RF tuner very carefully, and replace the condenser in the same relative position with an exact unit, because these front-ends are very frequency-sensitive.

RCA Model 2T51 and 2T60
Photofact Set No. 111, Folder No. 11

Complaint: Picture unstable in the horizontal, near top of picture.

Cause: C-5 2 mfd. in the AGC circuit, defective.

Remedy: Not having a 2 mfd. unit in stock, I replaced with a 4 mfd. @ 50 volts and the jittering at top of picture was rock-steady.

Editor's Note: Both above experiences were submitted by:

Horace D. Westbrooks
117 W. Solomon Street
Griffin, Georgia

* * *

RCA 45 Record Player, Model RP168
Photofact Set No. 72, Folder No. 10

Complaint and Remedy: Continuous tripping was not caused by spring 44 missing, or trip slide 47 binding,

but by the need of one drop of oil on the part of Item 50, actuated by spring 51.

Wm. L. Farley
Farley Radio Service
115 S. Main Street
Crookston, Minnesota

* * *

RCA Model 9T57, Chassis KCS49
Photofact Set No. 111, Folder No. 1A

Complaint: Poor or no sync at low contrast setting.

Cause: Resistor (RCA No.) R-135 had been confused in assembly with another value. This resistor should be a 4700 ohm, 1/2 watt unit. Found in its place was a 270,000 ohm unit (same color but one was read backwards).

Remedy: Obvious.

Paul McCray
Arlington Radio Laboratories
10th & North Washington Blvd.
Arlington, Virginia

* * *

BENDIX Model 2025
Photofact Set No. 99, Folder No. 5

Complaint: Intermittently narrow picture. Sound okay, picture okay, for periods of one-half hour at times, then spaces of one inch or more would appear on one or both sides of picture.

Cause: Two 470 ohm resistors in parallel, Items R68 - R69, (horizontal output cathode resistors) had increased in value to 900 ohms.

Remedy: Replace R68-69 and set works perfectly.

PHILCO Model 49-1600
Photofact Set No. 50, Folder No. 13
and
PHILCO Model 49-1602
Photofact Set No. 55, Folder No. 18

Complaint: One set was dead. The other was dead at times. Same trouble was found on both.

Cause: No B+ voltage off rectifier tube, but all components in power supply circuit checked okay. However, Item 8, 20 mfd., 150 V. voltage doubler broke down under load.

Remedy: Replace Item 8 and voltage is normal.

Editor's Note: Both above experiences were submitted by:

Thomas H. Ellery
1661 Oakland
St. Clair, Mich.

* * *

EMERSON Model 622
Photofact Set No. 108, Folder No. 5

Complaint: Raster intermittent.

Cause: Defective 8200 ohm resistor R85 in the screen grid circuit of the 6BG6-G tube. In some chassis this resistor connects to the horizontal linearity control in the cathode circuit of the 6W4 tube instead of the B+ line.

Remedy: Replace resistor.

Eddie Davis
Radio Service
610 West Market Street
New Albany, Indiana

* * *

GENERAL ELECTRIC Model 50
Radio Alarm Clock
Photofact Set No. 7, Folder No. 16

Complaint: Extremely loud motorboating hum all over the dial.

Remedy: Substitution of three filter capacitors, and of AC filter capacitor failed to rectify trouble. Replace 50L6 GT tube and radio plays fine.

Note: 50L6GT tested okay and did not show any internal shorts in tube tester.

SILVERTONE Model 6424

Trouble: Intermittent, sudden burst of distortion any place on the dial.

Remedy: Replace .03 capacitor (tone control bypass) from speaker field to cathode of the 25L6G tube. Radio played like new with this replacement.

Editor's Note: Both above experiences were submitted by:

John H. Sharpless
Sharpless Radio
2642 Central Avenue
St. Petersburg, Florida

* * *

BENDIX Television Model 2025
Photofact Set No. 99, Folder No. 5

Complaint: No picture. No raster on screen.

Cause: After considerable checking of all components in the horizontal oscillator and deflection circuit, with the only difficulty found that the voltage on the "boost B+" circuit was abnormally low, the trouble was finally traced to the vertical circuit, which was drawing excessive current.

Analysis: The trouble was open capacitor C40 (.003 mfd.) which kept the vertical oscillator from oscillating and the output tube then draws so much current that the horizontal high voltage circuit does not operate. This difficulty might also occur in other receivers which use the "boost" voltage to operate the vertical deflection system.

Willard W. Waite
Waite Radio & Electric
117 Herrick Avenue
East-Wellington, Ohio

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 SET 110.

The following list of production changes were made on Dumont Model RA-109A.

TO ELIMINATE BACKGROUND HUM IN SOUND

Heater choke L30 removed, and filament line connected direct.

TO IMPROVE THE HIGH FREQUENCY TONE QUALITY

C85 removed.

C83 changed to 680MMF

TO ALLEVIATE INTERFERENCE ON CHANNEL 7

Spring clip, part number 03015300, inserted between inputuner and chassis.

TO SIMPLIFY CIRCUITRY

C102 removed

C103 changed to .15MFD

C125 removed

C126 changed to 160MMF@ 2000V. and reconnected to Pin 8 of V30.

TO IMPROVE VERTICAL LINEARITY AND INCREASE MECHANICAL RANGE OF THE VERTICAL HOLD CONTROL

R117 changed to 2.2Meg.

R112 changed to 470KΩ

1.2Meg resistor connected in parallel with R9.

TO IMPROVE ADJACENT CHANNEL SOUND ATTENUATION

1st Video IF coil changed to part number 20, 005, 211.

Coupling coil part number 21006781 added from the input of the 1st video IF coil to ground.

TO PREVENT 60 CYCLE HUM IN AM POSITION

In Sherbrooke Models, grounding strap (part #35009731) added on top of chassis shelf between AM chassis and television chassis.

TO ELIMINATE CORONA

The horizontal output transformer changed to part # 20004942

TO REDUCE SYNC COMPRESSION, RAISE DETECTOR LEVEL, AND INCREASE SENSITIVITY

The 4th Video IF tube V7 changed to a 6BC5. A tube shield base and tube shield added to reduce possibility of regeneration. Pin 2 removed from ground. Pin 2 and 7 are tied together internally in the tube.

R34 changed from 120Ω to 220Ω.

The 4th Video IF coil changed to part # 20005241.

A 20MMF capacitor added between Pin 1 of V9 and ground.

V25 changed to a 6BC5

TO REDUCE DEFLECTION YOKE TEMPERATURE AND IMPROVE THE FOCUS

The vertical output transformer changed to part # 20005032.

The deflection yoke changed to part #21004711 or 21006191

TO MINIMIZE BREAKDOWN EFFECTS BETWEEN CRT AND SHELF

A polyethylene sheet is added to cabinet shelf under the front of the cathode ray tube rim.

CATHODE RAY TUBE CHANGE

Cathode ray tube changed to 19AP4A due to change in color of face plate.

DUMONT MODEL RA-109A

(CONTINUED ON REVERSE SIDE)

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1951 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PRODUCTION CHANGES
BULLETIN 14

PRODUCTION CHANGES
BULLETIN 14

INPUTUNER CHANGE

The Four Circuit Inputuner replaced by the Four Circuit Skip Band Tuner part #8900301l, starting with serial number 0920977.

TO REDUCE TUNEABLE HUM

R97 removed and the circuit connected direct.

C56 changed to .05MFD

TO IMPROVE SENSITIVITY AND INCREASE VIDEO DETECTOR OPERATING LEVEL

68KΩ added from pin 5 of V7 to junction of C49A and R36.

Heater choke, part #21004601, added in filament line between pin 4 of V4 to pin 4 of V5.

TO INCREASE SENSITIVITY OF AM TUNER IN SHERBROOKE TELESETS

R169 changed to 47KΩ

TO REDUCE SOUND REGENERATION

A tube shield part #42002530 and tube shield base part #42002540 added over tube V17.

TO MAKE FUSE MORE ACCESSIBLE

M5 changed to cartridge type and clip mounted on top of the main chassis inside the high voltage shield.

CHANGE OF CARTRIDGE ON RECORD CHANGER

An alternate cartridge is used in the Sherbrooke record changer. This cartridge requires a compensating network consisting of 150KΩ resistor in series with the cartridge, and a 470KΩ resistor shunted with a 150 MMF capacitor in parallel with the cartridge.

TO ELIMINATE BLACK LINE ON LEFT SIDE OF PICTURE

A 5000MMF at 450V capacitor added from junction R159A and R159B to ground.

SPEAKER CHANGES

The speaker on the Sherbrooke set changed to a 12" speaker part # 18002791.

Mahogany and blonde models also have this change, starting with serial numbers 094159 and 09295 respectively.

Figure 1

Figure 2

COLUMBIA
MODEL 104

COLUMBIA
MODEL 104

SPECIFICATIONS

Your COLUMBIA LONG PLAY "Microgroove" Record Changer attachment is designed to play and automatically change as many as ten - 12", twelve - 10", twelve - 7", or any assortment of 10" and 12" LP records intermixed, at the speed of 33-1/3 RPM.

Connect this changer only to an outlet supplying 117 volts, 60 cycles AC, unless otherwise specified.

Manufactured by:

V-M CORPORATION
Benton Harbor, Michigan

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Figure 3

OPERATION

Loading:

1. Pull straight up on record support knob until record support clears spindle. Swing record support to the right until pin in shaft drops into locating groove.

2, Changer will automatically play ten - 12", twelve - 10", any assortment of ten - 12" and 10" records, or twelve - 7" long-play Microgroove records, at the speed of 33-1/3 RPM.

3. Place records on spindle and lower to the offset shelf. Hold records level and replace record support over spindle.

Starting the Changer:

To start the automatic LP changer, turn the control knob (18) to "Rej." and release. Changer will now operate automatically, in playing the stack of records, and will continue to play the last record until the changer is turned off.

Leveling Record Changer:

It is essential to have the LP record changer attachment absolutely level. Use a torpedo or similar type level on the record changer baseplate. Use adequate shims to level the record changer base to achieve perfect level.

Rejecting:

To reject a record at any time while changer is operating, turn changer control knob to "Rej." and release.

Stopping:

To turn off changer, turn changer control knob to "Off". Lift pickup arm and place on rest.

Unloading:

Lift the record support and swing to the left until pin on shaft drops into locating groove. Lift stack of records straight up and off spindle.

Repeating of 7", 10", or 12" Records:

To repeat records, swing record support clear of spindle, place record on the turntable, and start changer. Record repeats until control is turned off. If a 12" record is repeated, wait for the changer to finish cycling and reposition the pickup arm manually to the 12" position.

Suggestions:

When loading and unloading the changer, use care to prevent bending of the spindle. Records should not be left on the spindle except during operation of changer. Records will warp. For best reproduction, keep needle and records clean. Store records flat, in folders or in albums. Do not lay record on record.

CHANGE CYCLE

This changer is provided with what is known as a velocity trip mechanism. The change cycle is

started by the faster, inward motion of the pickup arm when the needle enters the trip grooves at the end of the record. Only records having fast-finishing grooves before the eccentric cycling groove will operate this velocity trip.

The pickup arm and hinge assembly and trip finger cam (62) are secured at opposite ends of the pickup arm shaft and sleeve (10) so that they move in unison. As the pickup arm nears the end of the record, the trip finger cam (62) pushes the trip link (53), which, in turn, engages the trip lever (29F) rotating the pawl lever (29C) to move the trip pawl (29E) toward the hub on the turntable. While a record is playing, the small motions of the trip pawl (29E) are not sufficient to cycle the mechanism because on each revolution of the turntable the wiping contact by the hub projection moves the trip pawl (29E) back to clear the projection.

In the first revolution of the turntable during which the pickup arm advances rapidly, the trip pawl (29E) is moved far enough to definitely engage the projection on the turntable hub. The gear on the turntable hub will now engage the main gear (29) and start its rotation. This, in turn, starts the lateral motion of the slide and cam assembly (66). The slide and cam assembly moves to the rear through the action of an eccentric (29H) on the main gear (29) moving in the cross slot on the slide and cam assembly (66).

As the slide and cam assembly (66) begins to move, the cam surface at the rear pushes the lift pin (12) upward, raising the pickup arm clear of the record. At the same time, the tab on the rear of the slide and cam assembly (66) contacts the trip finger cam (62) swinging the pickup arm clear of the turntable.

The front edge of the ejector link slot in the slide and cam assembly (66) then contacts the ejector link on the ejector link assembly (54). The ejector link moves the pusher shaft and housing assembly upward actuating the spindle assembly (2), causing the record pusher to move straight up so as to enter the center hole of the records, and then to be pivoted forward, dropping a record to the turntable.

Simultaneously, the tab on the rear of the slide and cam assembly (66) contacts the pickup arm return locator (46), moving it clear of the reset lever (27); at the same time, the pickup arm return locator (46) is locked in position with the trip finger cam (62) by means of matching holes in the pickup arm return locator (46) and detents in the trip finger cam (62). This is accomplished by the pressure of the compressed conical lift pin spring (64).

At the same time, the cam surface of the bracket on the main gear assembly (29) moves the reset lever (27) to mid-position (10" set-down) where it is held by the 12" record selector (9). The slide and cam assembly (66) continues to the rear and then starts forward. If 7" records are being changed, the rubber bumper (45) of the 7" set-down lever (49) is free to move upward permitting the other end to drop into the hole in the main gear (29) as this gear rotates. This action of the 7" set-down lever (49) raises the reset lever (27) to the upper position (7" set-down).

If 10" records are being changed, the 7" set-down lever (49) will not operate as the rubber bumper (45) will contact the edge of the record and the reset lever (27) will remain in the mid-position (10" set-down) as originally placed by the camming action of the bracket on the main gear (29).

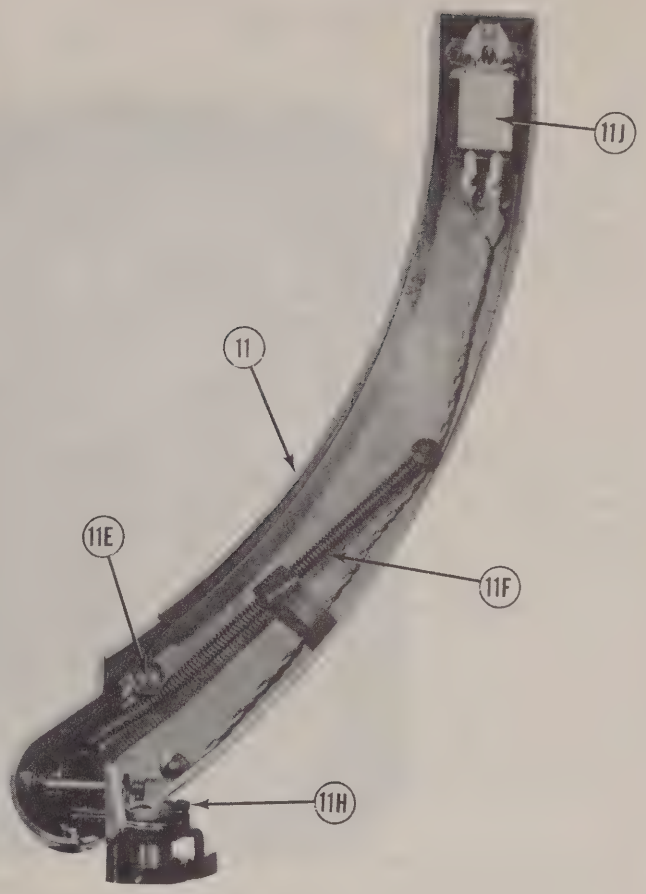


Figure 4

If a 12" record is being changed, the edge of the record strikes the 12" record selector (9) releasing the reset lever (27), which drops to the bottom position (12" set-down).

As the slide and cam assembly (66) continues forward, the tab on the rear of the slide will move clear of the pickup arm return locator (46) and trip finger cam (62), which are still locked together. These rotate under the action of the pickup arm return spring (36) until one of the three set-down steps in the pickup arm return locator (46) strikes the reset lever (27), which has been positioned by the record being changed (see above). This stops the inward movement of the pickup arm return locator (46), trip finger cam (62) and pickup arm. The pickup arm is then lowered to the lead-in grooves of the record at this point as the lift pin (12) rides down the rear cam surface of the slide and cam assembly (66). As the pressure is released from the conical lift pin spring, the trip finger cam (62) is separated from the return locator (46) by the spring washer (46A), permitting the pickup arm to ride freely across the record. This completes the change cycle.

LUBRICATION

Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high-operating temperature, the changer should be lubricated as follows (refer to the exploded view):

Apply Andok "B" to:

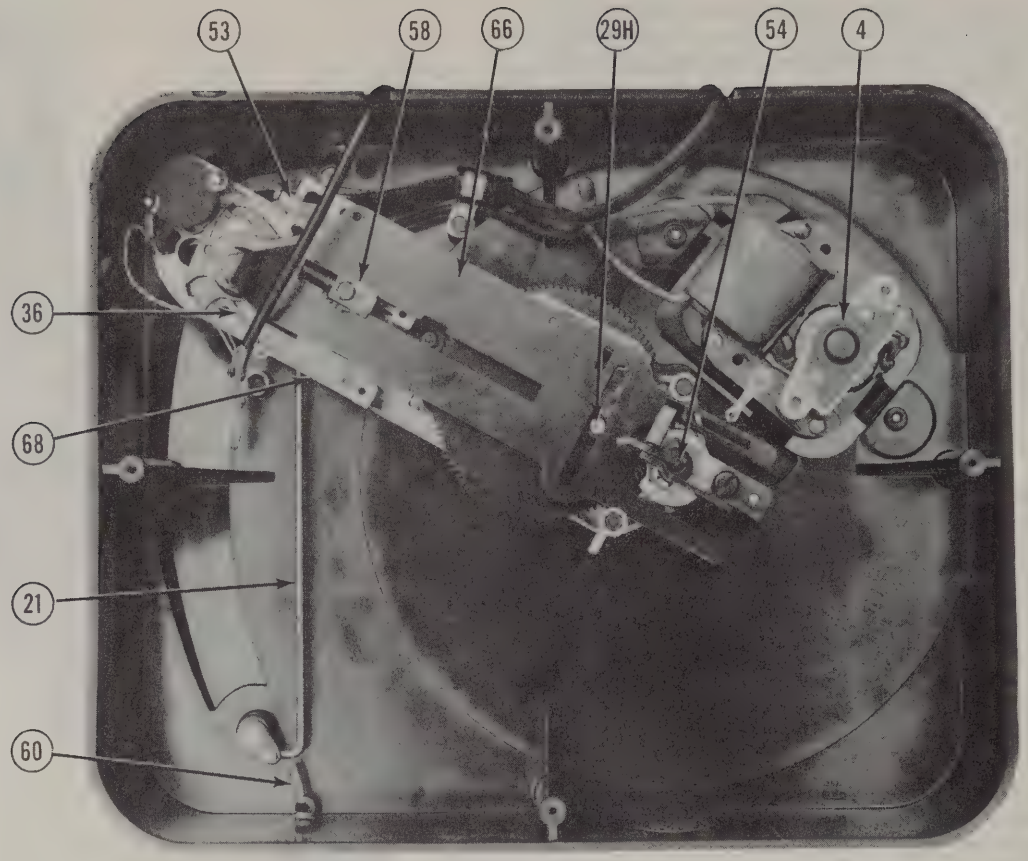


Figure 5

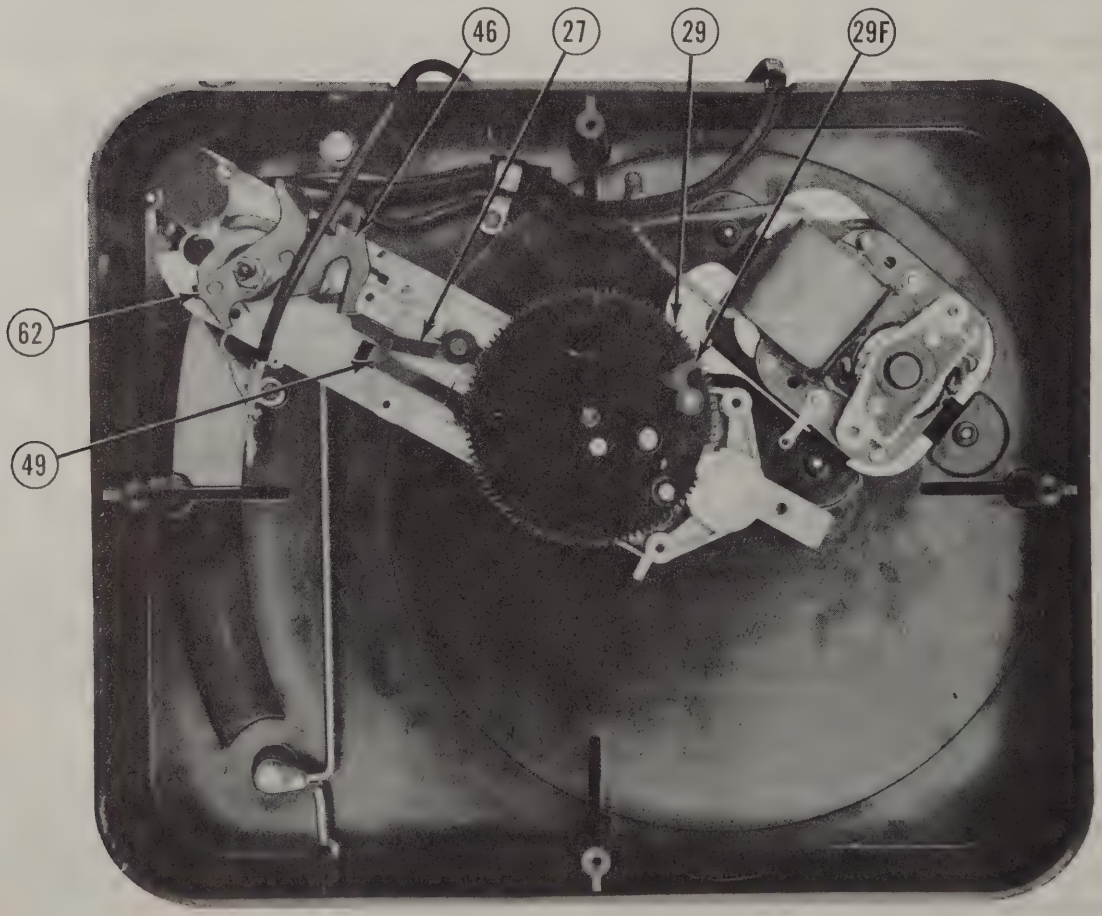


Figure 6

1. Edges of all slots in slide and cam assembly (66).

2. Outer edges of times on forked end of slide and cam assembly (66).

3. Lift pin cam surface on slide and cam assembly (66).

4. Lower surface of pickup arm return locator (46).

5. Inner surface of tab on rear of slide and cam assembly (66).

6. Turntable ball bearing (6).

7. Eccentric pin on main gear assembly (29H).

Apply a small quantity of light mineral oil to:

1. Pickup arm shaft and sleeve bearing (10).

2. Turntable and spindle bearing.

ADJUSTMENTS

Needle Set-Down (Refer to Figure 4):

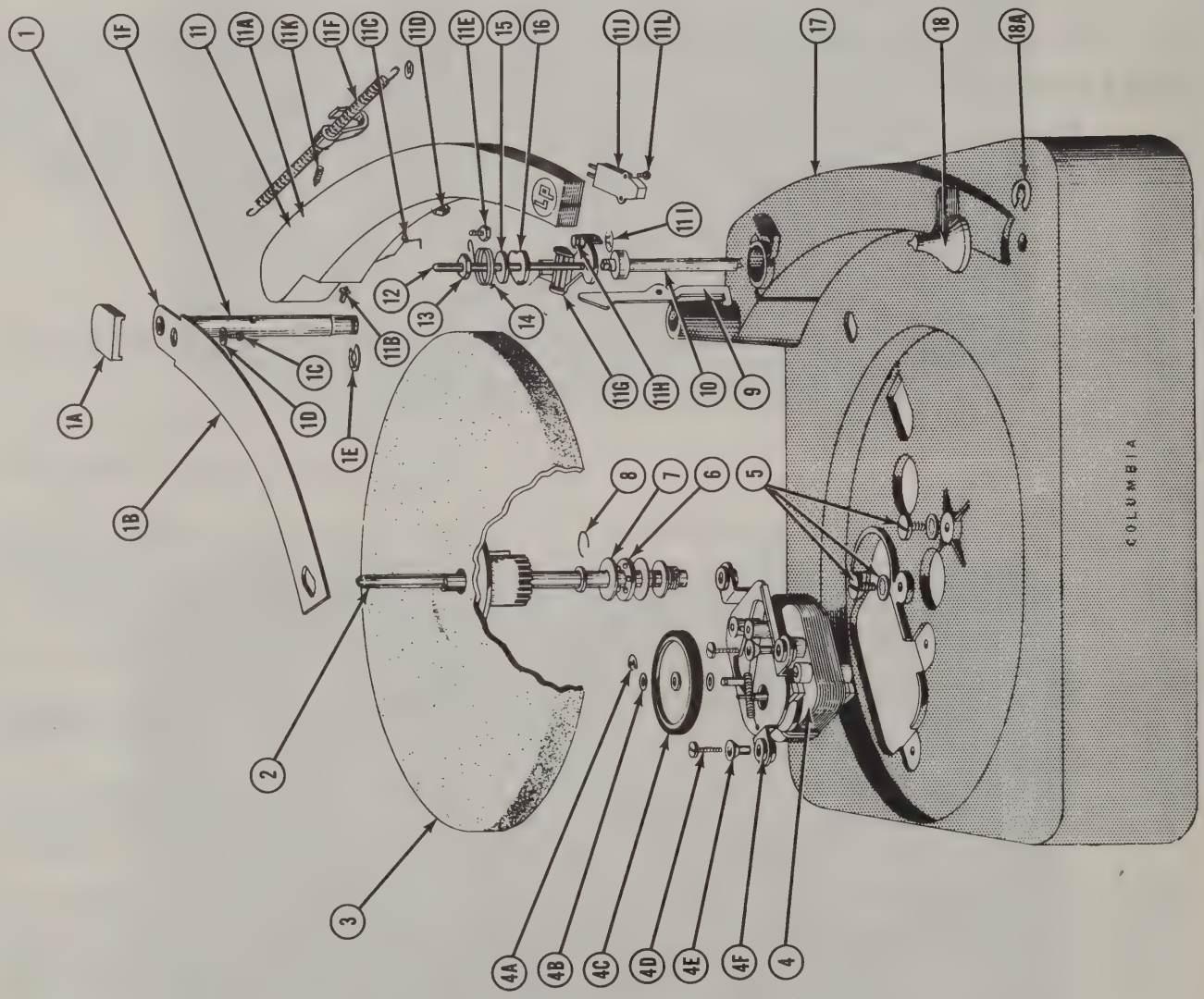
The set-down position of the needle is adjusted by means of the set-down adjustment screw (11H) mounted on the hinge arm assembly (11B). Turn this screw adjusting the pickup arm for correct set-down on 10" record. When the correct set-down is obtained for the 10" position, the 12" and the 7" needle set-down will also be correct.

Pickup Arm Height (Refer to Figure 4):

The pickup arm height is adjusted by the lift screw (11E) located at the rear of the strengthener. To raise the height of the pickup arm, turn this screw counterclockwise. To lower the pickup arm, turn clockwise. The pickup arm height should be adjusted so that with a 1-1/8" stack of records the pickup arm lifts 1/4" straight up as the change cycle starts.

TROUBLE CHART

SYMPTOM	CAUSE	REMEDY
Turntable does not revolve when control is turned on.	1. No current at motor.	(a) Check that current is reaching AC leads of changer. (b) Check that switch is closing. (c) Check wiring and soldered terminals in the changer.
	2. Motor defective.	(a) Remove turntable to allow motor to operate without load. If current is reaching motor and drive spindle does not rotate, the motor is defective. Repair or replace.
	3. Motor idler wheel (4C) not engaging turntable rim.	If drive spindle is turning but turntable is not: (a) Check motor idler assembly to determine if it is free to contact the drive spindle and turntable rim. (b) Wipe off inside rim of the turntable (3) to remove flock, or if oily, clean the turntable rim and rubber tire of the idler wheel (4C) with naptha.
Changer does not cycle when the control knob is turned to "Rej."	1. The manual reject not acutating the trip.	(a) Turn the control knob (18) to the reject position, hold and see that the control shaft assembly (43) has moved the trip link (53) to the rear. This should actuate the trip pawl (29E) on the main gear (29), which will bring the spur on the trip pawl (29E) in contact with the hub gear on the turntable hub. (b) Check for binding of the pawl lever (29C), the trip lever assembly (29F) and the trip pawl (29E). If binding occurs, clean out all foreign matter and check for freedom.
Control knob cannot be turned to "On" position.	1. Machine shut off during cycle.	Turn the turntable clockwise, by hand, until the control knob (18) is free.
Pickup arm strikes records	1. Pickup arm height	(See instructions for adjusting pickup arm


1
1F
11
11A
11K
11F
11C
11D
11E
15
16
11J
11L
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18
18A
11I
12
13
14
11B
1C
1D
1E
11G
11H
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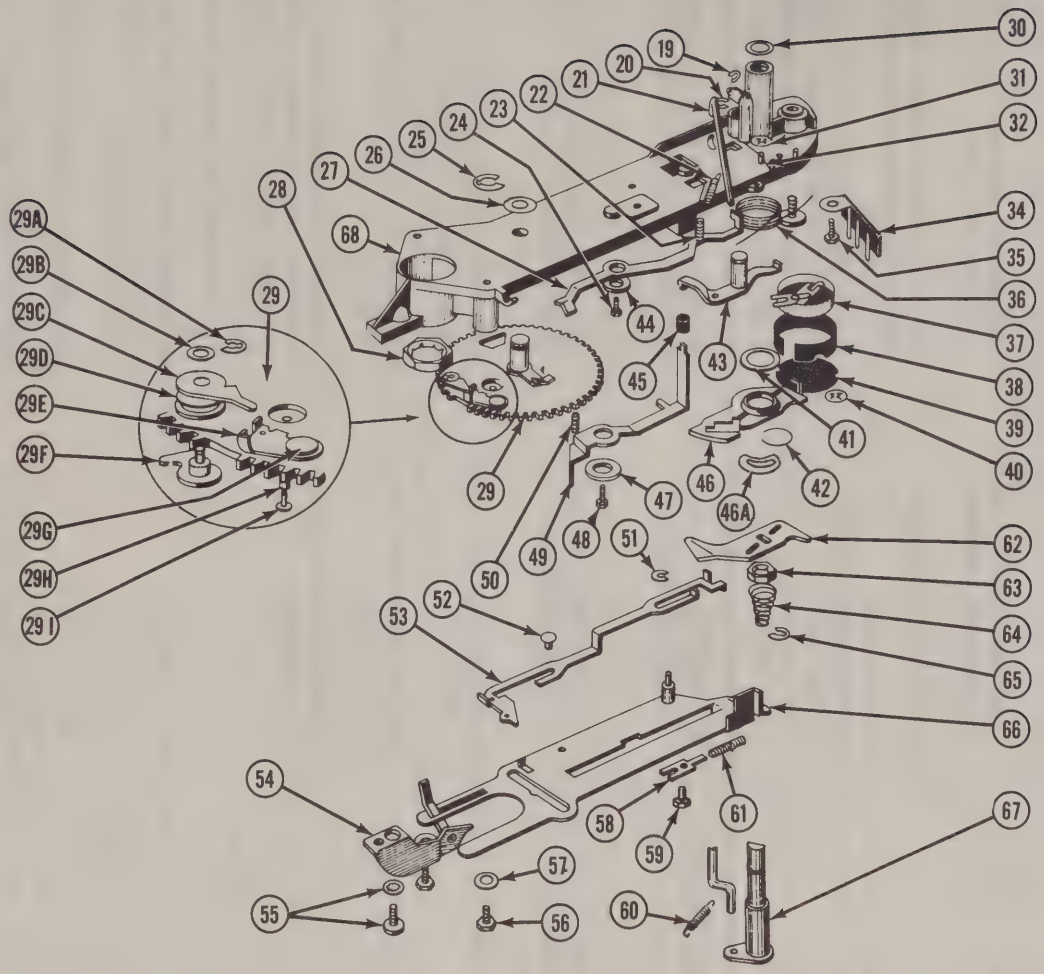
COLUMBIA



A PHOTOFACT "EXPLODED" VIEW

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TROUBLE CHART (Cont'd)

SYMPTOM	CAUSE	REMEDY
on spindle when it raises, or pickup arm when it moves out.	not adjusted properly.	height under "Adjustments").
Turntable speed too slow (refer to exploded view).	1. Binding in turntable bearing.	Check the turntable bearing for freedom. Hold the motor idler wheel (4C) out of engagement with the turntable and spin the turntable, by hand, to see if it turns readily and coasts for a long time. If binding occurs, remove turntable, clear off foreign matter, and lubricate with light mineral oil.
	2. Motor pulley too small in diameter.	Replace the motor pulley with one having a greater diameter.
	3. Line voltage too low.	The line voltage should not be less than 105 volts or the turntable may be too slow.
	4. Operating temperature too low.	If the machine has been stored in a cold place or operated in surroundings at a temperature of less than 60°F., the turntable speed may be too slow.
Turntable speed too fast.	1. Motor pulley too large in diameter.	Replace the pulley with one having a smaller diameter, or grind one or two thousandths off the pulley.
Turntable stalls or slows down during cycle (refer to exploded view).	1. Motor idler not engaging turntable.	(See "Turntable Does Not Revolve When Control Knob Is Turned to 'On' Position").
	2. Turntable bearing tight.	(See "Turntable Does Not Revolve When Control Knob Is Turned to 'On' Position").
	3. Line Voltage too low.	The line voltage should not be less than 105 volts.
	4. Binding in drive mechanism.	Hold idler (4C) away from turntable, or remove idler wheel. Cycle machine by turning turntable slowly by hand. The main gear should turn freely for the complete revolution without binding at any point:
		(a) If binding occurs, check for foreign matter in the gear teeth, a bent gear bearing, or bent spindle bushing.
		Straighten or replace. Clean and lubricate.
	5. Bindingbetween pickup arm lift pin (12) and lift pin cam surface on slide and cam assembly (66).	Lift pin should ride freely on cam surface without binding.
	6. Spindle pusher spring compressing too far.	Cycle the changer and watch the relationship between the bottom of the pusher housing and the lower button of the pusher housing. Just before the slide and cam (66) has completed its backward motion, the pusher housing should stop its upward motion and the lower button should continue up .005 to .047" more, slightly compressing the pusher spring. If the spring compresses too much, the changer may stall on the shut-off cycle.

SYMPTOM	CAUSE	REMEDY
	7. Motor weak.	When everything checks all right, but the changer still stalls in cycle, the motor may be weak.
	8. Grease on idler wheel.	1. Wipe off idler wheel rubber tires, inner rim of turntable with naptha.
	9. Idler wheel bent and not making positive engagement with drive pulley.	1. Straighten idler, or replace, as necessary.
	10. Turrets unseated from lock ring on turret shaft.	Remove turret and center lock ring. (If lock ring is distorted, replace with new lock ring). Replace turret and press down to assure turret's being locked to the turret shaft. (Turret will snap into position when properly locked).
	11. Idler wheel tension spring weak.	Replace spring or bend motor tension spring anchor bracket to give desired tension.
Changer continues to cycle.	Reject mechanism binding.	(a) Make certain the trip link (53) is not frozen in the reject position. (b) Make certain the changer control lever (43) is not binding and that it actuates the trip link (53) when the changer control knob (18) is turned to reject. (c) Check for binding of trip pawl (29E), trip lever (29F) and pawl lever (29C); these must be free to turn easily. (d) Check the changer control linkage (67), (43) and (21).
Noise during playing of record.	1. Motor rumble.	If a low-pitched rumbling sound comes from the loud speaker while a record is being played, check motor grommets to be sure the motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float. Motor rumble may also come from an unbalanced motor rotor; in this case, replace the motor.
	2. Defective turntable bearings (6).	Defective turntable bearings can cause rumble. Check for foreign matter in the bearing; defective balls; binding between balls and ball retainer and rough surface on washers. Clean ball bearing, sleeve bearing, and washers; lubricate with Andok "B" and light mineral oil.
	3. Defective motor idler wheel.	A rapid thumping sound while the motor is running may indicate a flat spot on the motor idler wheel (4C). If this condition does not clear up after ten minutes of running time, remove the turntable and check the rubber tire on the idler. If the surface of the rubber tire is not smooth and even, replace the idler. Should the bearing of the idler wheel show signs of excessive wear, or be extremely wobbly, the idler wheel should be replaced.
	4. Defective record.	Worn or defective records cause needle scratch and distortion of the recorded sound. If the record is warped, it may slip on the other records causing "Wow" (a

TROUBLE CHART (Cont'd)

SYMPTOM	CAUSE	REMEDY
		waver in the recorded sound). An enlarged hole in the record can also cause "Wow"
	5. Turntable scrapes.	If a scraping sound occurs as the turntable revolves, check:
		(a) Turntable warped, causing outer rim to rise and fall.
		(b) Motor idler or mounting plate bent.
	6. Squeaks.	Squeaking sound as changer operates indicates lack of oil. Lubricate points indicated under "Lubrication".
	7. Pulleys on motor not properly seated.	Check that pulleys are properly seated.
	8. 7" lever (49) loose.	Check 7" lever washer and screw (24) to see if they are tight.
Distortion of Recorded Sound.	1. Defective record.	(See Noise During Playing of Record").
	2. Defective amplifier.	Check phonograph amplifier and speaker.
	3. Bad cartridge.	Replace.
No Sound During Playing.	1. Defective cartridge.	Replace.
	2. Defective wiring.	Check pickup leads for a shorted or open lead.
	3. Defective amplifier.	Check phonograph amplifier and speaker.
	4. Loose cartridge terminal clips.	Remove, squeeze together slightly, and replace.
Excessive Record Wear.	1. Binding on pickup arm.	(See "Needle Does Not Track Across Record Properly").
Rough pickup arm motion.	1. Horizontal defects.	(a) Check pickup arm return locator (46) for tightness.
		(b) Check that pickup arm return spring (36) is not weak and is hooked up properly.
		(c) Check that fiber washer (41) is installed under pickup arm return locator.
	2. Vertical defects.	(a) Lift pin (12) binding; clean out dirt and lubricate.
		(b) Slide and cam (66) binds; check bearing points -- clean and lubricate.
		(c) Burrs in main slot in slide cam (66) -- remove with fine file.
		(d) Ejector lever on ejector bracket assembly (54) binding in slide and cam slot; straighten, remove burrs, and lubricate.
		(e) Pickup arm shaft and sleeve binding; clean and lubricate.

SYMPTOM	CAUSE	REMEDY
Noise during Change Cycle.	1. Tines on the forked end of the slide and cam assembly (66) bent.	Replace.
	2. Control lever bent.	Straighten or replace. Check that "C" washer (20) holds.
	3. Lack of lubrication. Grinding noise.	Lubricate ejector lever (54) where it contacts lower end of spindle (2).
Cartridge drags on record.	1. Needle bent.	Replace.
Impossible to adjust set-down.	1. Pickup arm shaft and sleeve assembly (10) defective.	Shift the safety plate (16) toward the eccentric set-down adjusting screw (11H), and tighten pickup arm shaft and sleeve nut (13). Hold pickup arm against rear stop and push on trip finger cam (62). The safety plate (16) should move away from the set-down adjusting screw (11H) and snap back when the trip finger cam (62) is released; if it does not, replace the pickup arm shaft and sleeve assembly (10).
Record does not drop when changer cycles.	1. Spindle pusher shaft and housing assembly broken.	If the pusher shaft (inside the spindle) is broken, the lower end (housing) will drop out of the spindle (2). Loosen spindle nut (28) and remove spindle (2). Replace with new spindle unit.
	2. Record pusher in spindle not moving far enough forward to reject a record.	The record pusher should move up inside the spindle body, then forward until it has reached a point flush with, or a maximum of, .010" beyond the spindle body (2). To insure that the record pusher is all the way forward, the lower button on the shaft and housing assembly should be raised high enough by the ejector lever to slightly compress the pusher spring inside the pusher shaft and housing assembly. (See "Turntable Stalls During Cycle"). If the spring is compressed and the record pusher does not move far enough forward to eject a record, the spindle (2) should be replaced. If a record is not pushed completely off the ledge, it may hang on the spindle momentarily, then drop on the pickup arm when it moves in over the turntable.
	3. Record pusher raises outside the spindle body.	When changer cycles, the record pusher should rise up just inside the spindle body, then move forward inside the center hole in the record. If the record pusher rises outside the spindle body, it will raise the record instead of pushing it off the spindle ledge. Remove the spindle (2) and replace with a complete, new spindle assembly.
Two records drop at once.	1. Hole in record too large.	Check the diameter of the hole in the record. An oversize hole will cause two records to drop at once.
	2. Spindle guide not fully down.	If the spindle guide is not all the way down, more than one record may be dropped at a time. (a) Check the guide to be sure it is free and does not bind at any point. Clean out foreign

TROUBLE CHART (Cont'd)

SYMPTOM	CAUSE	REMEDY
		matter or straighten if necessary. Do not oil.
		(b) When records are placed on the spindle, be sure the guide is all the way down. The guide will normally raise as a record is being dropped, but it should return to place immediately, by gravity.
	3. Record support (1B) binding on spindle, or bent out of square with shaft.	The record support (1B) must be able to slide freely, by gravity, down the spindle. If the support does not follow the records down as they are being ejected, two or more records may be ejected at once. If binding occurs:
		(a) Check the spindle (2) to determine if it is straight. Bend carefully with the fingers, if necessary.
		(b) Straighten the record support (1B) if it is not square with the record support shaft.
		(c) When the pin in the record support shaft has just entered the slot in the record support shaft post on the baseplate, the play in the record support (1B), as it is swung from side to side, should be equal on both sides of the spindle. To correct bent condition, hold the support shaft and carefully force the record support into proper position. If the support is loose on the shaft, remove the knob and restake with hammer and punch.
	4. Record pusher defective.	The record pusher may be deformed, etc. This may cause two records to drop at once. Replace with new pusher or replace spindle assembly.
	5. Slide play in spindle (2).	Tighten spindle nut (28). If stripped, replace.
Record hits pickup arm (refer to exploded view).	1. Record pusher not moving far enough forward to eject record.	(See "Record Does Not Drop When Changer Cycles" - 2).
	2. Record pusher extending beyond outside diameter of spindle.	Cycle changer, by hand, until pusher shaft and housing assembly is at the top of its travel. Using new record as a gauge, pass it over the spindle to see if it binds at any point. File off high points on record pusher, with a fine file, until record will pass freely over spindle.
	3. Pickup arm not adjusted properly.	(See "Adjustments").
Needle does not set down on 10" record in proper position (refer to exploded view).	1. Pickup arm not adjusted properly.	(See "Adjustments"). (a) Loosen nut (13) on pickup arm shaft and sleeve (10).
	2. Pickup arm shaft and sleeve (10) binding.	File off burrs and rough surfaces. Polish and lubricate shaft.
	3. 7" set-down lever	Insure that the proper operation and reset

SYMPTOM	CAUSE	REMEDY
	(49) and 12″ record selector (9) not operating properly.	of the 7″ set-down lever (49) and 12″ record selector (9) are not being interfered with.
	4. Needle bent.	Replace with new needle.
	5. Wire spring (32) broken.	12 record selector (9) does not cock: check for broken 12″ record selector spring (32).
	6. Bent pickup arm return locator (46).	Straighten or replace.
	7. Bent trip finger cam (62).	Straighten or replace.
Needle does not set down on 12″ record in proper position (refer to exploded view).	1. Diameter of 12″ record undersize.	The set-down position of the needle for 12″ records is determined by the edge of the record striking the 12″ record selector (9). If a 12″ record has a diameter of less than the standard size of 11-7/8″, plus or minus 1/32″, it may fail to depress the 12″ record selector far enough.
	2. Enlarge center hole in record.	An enlarged center hole might fail to set the 12″ record selector because it could produce the same effect as a small record.
	3. Pickup arm not adjusted properly.	(See "Adjustments") (a) Loose nut (13) on the pickup arm shaft and sleeve (10). Tighten.
	4. Binding of pickup arm shaft and sleeve (10).	Clean and polish shaft (10), and lubricate with light oil.
	5. Reset lever spring (23) broken.	Replace spring (23).
	6. 12″ record selector spring (32) broken.	Replace spring (32).
	7. 12″ record selector (9) binding.	The 12″ record selector must be free to operate smoothly. Clean out dirt and straighten if bent, or replace.
	8. Bent pickup arm return locator (46).	Straighten or replace.
	9. Bent trip finger cam (62).	Straighten or replace.
Needle does not set down on 7″ record properly.	1. 7″ set-down lever spring (50) broken or weak.	Replace.
	2. Pickup arm not adjusted properly.	(See "Adjustments"). (a) Loose nut (13) on pickup arm shaft on sleeve: tighten.
	3. 7″ set-down lever screw (24) loose.	Tighten.
	4. 7″ set-down lever (49) hitting frame or baseplate when it goes through hole in frame.	Straight or replace.
	5. Reset lever (27) bent.	Replace.

TROUBLE CHART (Cont'd)

SYMPTOM	CAUSE	REMEDY
	6. 7" set-down lever (49) does not fall into opening in main gear.	Replace.
	7. Bent pickup arm return locator (46).	Straighten or replace.
	8. Bent trip finger cam (62).	Straighten or replace.
Changer does not cycle when record has been played.	1. Needle jumps out of grooves in record.	(a) Check trip pressure: The lateral pressure should not exceed 3 grams. (If pressure is excessive, see "Changer Trips Before Needle Reaches End of Record").
		(b) The needle point may be damaged or affected by an excessive accumulation of dust, lint, etc.: Check needle pressure as described under "Adjustments".
		(c) There may be binding in the pickup arm shaft and sleeve assembly (10) or between the pickup arm return locator (46) and trip finger cam (62): See "Needle Does Not Track Properly Across Record").
	2. Trip pawl (29E) binding on gear face.	The trip pawl must be free to move forward and engage the boss on the turntable hub when the trip lever releases it. Check for burrs or foreign matter lodged between the trip pawl (29E) and main gear (29). Do not oil as this might collect dirt and gum up the pawl.
	3. Trip finger cam (62) bent.	Straighten or replace.
	4. Trip link (53) bent.	Straighten or replace.
Changer trips before needle reaches end of record.	1. Hole in record too large.	If the hole in the record is too large, the groove may turn eccentric with the spindle and cause premature tripping.
	2. Binding of trip link (53).	With the trip link released, check the trip link for freedom of motion. It should be free to move without binding.
Needle does not track across record properly.	1. Needle may be clogged by accumulation of lint, dirt, etc., or worn.	(a) Clean foreign material from around needle.
		(b) Check needle to see if the tip is bent or broken. Replace, if necessary.
	2. Trip finger cam (62) does not disengage from the pickup arm return locator (46) when cycle is completed.	There should be a 1/32" gap between the trip finger cam (62) and the pickup arm return locator (46) when the machine is not in cycle. If the gap is small enough to allow the parts to touch and bind as the needle moves across the record, the compression spring washer (46A) may be weak or broken. Replace.
	3. Check the bearing in the pickup arm post for binding.	(a) Check pickup arm return locator (62) and trip finger cam (62) for binding. (See 2 above).

SYMPTOM	CAUSE	REMEDY
	4. Changer not level.	(See "Leveling Record Changer During Long Play" under "Preparation for Operation").
	5. Pickup leads too tight.	Give the pickup leads enough slack to allow the tone arm to move freely across a record.

PART LISTS

Ref. No.	Part No.	Description	List Price
1	3715	Record Support Assembly	.83
1A	3712	Support Knob	.09
1B	3711-AD	Record Support	.16
1C	2904	Screw #4 x 3/16 Type Z R. H.	.01
1D	1589	Washer	.01
1E	2110	"C" Washer-Support	.01
1F	2530	Support Rod	.42
	3269	Cross Pin	.09
2	3683	Spindle Assembly	6.06
3	3563	Turntable Assembly	1.11
4	3722	Motor Assembly - Russell	7.75
4A	3041	"C" Washer for Idler Wheel	.04
4B	3363	Fiber Washer for Idler Wheel	.02
4C	3353	Idler Wheel	1.61
4D	3684	Screw #6 x 3/4 Type 23 Hex Head	.02
4E	1600	Grommet Spacer	.02
4F	2638	Motor Mounting Grommet	.03
5	3696	Screw #10-24 x 1/2 Sems B. H.	.02
	3677	Spindle and Bearing Assembly - Consists of Items 2-6-7 and 8	6.64
6	2624	Bearing	.26
7	2639	Washer	.05
8	2078	Retaining Ring	.07
9	2957	12" Record Selector	.19
10	2921	Shaft and Sleeve Assembly	.76
11	3676	Tone Arm and Hinge Assembly	
11A	3672	Tone Arm	1.71
11B	3602	Hinge Button	.06
11C	3736	Lock Spring	.05
11D	3728	Nut #8-32 x .100 Tk. 1/4 Hex	.03
11E	2912	Lift Screw	.06
11F	3964	Spring and Damper Assembly	.34
11G	2294	Hinge Arm Assembly - Consisting of Items 11F, 11G, 11H, and 11I	.29
11H	2269	Set-Down Eccentric	.03
11I	2926	Tinnerman Push On	.01
11J	3370	Cartridge - Astatic #CAC-J	8.00
11K	2310	Pivot Screw for Tone Arm	.03
11L	2631	Cartridge Mounting Screws	.01
12	3961	Lift Pin	.12
13	3887	Jamnut #1/4-28	.01
14	2247	Safety Spring	.02
15	3888	Lockwasher - Pickup Shaft	.01
16	2249	Safety Plate	.13
17	3671	Plastic Base	4.88
18	3673	Control Knob	.14
18A	1719	"C" Washer - Switch Control	.01
19	1588	"C" Washer	.01
20	1652	"C" Washer	.01
21	3675	Control Link	.15
23	2925	Spring Reset Lever	.01
24	3758	Screw #6-32 x 1/4 Hex Head Type 23	.03
25	1719	"C" Washer - Gear	.01
26	2221	Fiber Washer	.01
27	2560	Reset Lever	.19
28	2208	Palnut - Spindle #1/2-20	.02
29	2575	Gear Assembly - Complete	1.18
29A	1588	"C" Washer	.01
29B	2829	Fiber Washer	.01
29C	2940	Pawl Lever	.03
29D	2516	Spring Washer	.04
29E	2939	Trip Pawl	.14
29F	2569	Trip Lever Assembly	.14
29G	2943	Rivet for Pawl Lever	.04
29H	2977	Roller	.03
29I	2227	Rivet for Roller	.02
	2512	Gear Only	.23
30	2952	Fiber Washer	.01
31	1720	Speed Nut - Tinnerman #720	.01
32	2563	Spring - 12" Selector	.01
33		Phillips Head S. T.	.02
34	2951	Terminal Strip	.06
35	2087	Screw #6-32 x 1/4	.01
36	2574	Return Spring	.02
37	467	Switch	.41
38	2931	Fiber Strip	.01
39	2573	Switch Cover	.01
40	1720	Speed Nut - Tinnerman #720	.01
41	2266	Fiber Washer	.01
42	2271	Ring - Locator	.01
43	2284	Control Shaft Assembly	.17
44	492	Washer - Reset Lever	.01
45	2580	Bumper 7" Lever	.02
46	2561	Locator	.16
46A	2953	Spring Washer	.01
47	492	Washer	.01
48	2087	Screw #6-32 x 1/4	.01
49	2581	7" Set-Down Lever	.11
50	2579	Spring - 7" Set Down	.01
51	1588	"C" Washer	.01
52	2245	Rivet	.01
53	2958	Trip Link	.04
54	2571	Ejector Link Assembly	.23
55	409	Screw #10-24 x 5/16 Sems B. H.	.02

PART LISTS (Cont'd)

Ref. No.	Part No.	Description	List Price	Ref. No.	Part No.	Description	List Price
56	3758	Screw #6-32 x 1/4 Hex Head Type 23	.03	61	2246	Slide Spring	.01
57	2274	Washer Slide Bearing	.01	62	2520	Trip Finger	.12
58	2211	Slide Bearing	.10	63	1975	Palnut #1/4 x 28	.01
59	3758	Screw #6-32 x 1/4 Hex Head Type 23	.03	64	2262	Conical Lift Spring	.04
60	3901	Reject Spring	.06	65	1588	"C" Washer	.01
				66	2288	Slide Assembly	.37
				67	3682	Shaft and Arm Assembly	.21
				68	2525	Die Cast Frame	1.96

CROSLEY MODELS 11-301U, 11-302U, 11-303U, 11-304U, 11-305U

CROSLEY MODELS 11-301U, 11-302U, 11-303U, 11-304U, 11-305U

CROSLEY MODEL 11-301U

TRADE NAME	Crosley, Models 11-301U, 11-302U, 11-303U, 11-304U, 11-305U (Ch. 303)
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	Three Power Operated Portable Superheterodyne Receiver With Loop Antenna
TUBES (FOUR)	Types 1R5 Converter, 1U4 IF Amp.; 1U5 Det.-AVC-AF, 3V4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 1.5 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	.12 Amp. @ 117 Volts AC or 210MA @ 1.5 Volts DC and 9.8MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use AC power through an isolation transformer if possible.
After alignment is completed, and receiver reassembled, radiate a 1500KC signal into the loop.
Tune in the signal and set the pointer to 1500 on the dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400 ∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for max. output.
2.		Loop	1620KC	"	"	A5	"
3.		Loop	1500KC	Tune for max. output.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

CROSLEY
MODEL 11-301U

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AK	
V3	Det. -AVC-AF	1U5	1U5	6BW	
V4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	B-148246	PRSA10D6C6A				TVA-3433	Filter Red
B	30	100		40R				TVA-1205	Filter Blue
C	30	25							Filament Bypass - Green
D	200	10							Filament Bypass - yellow
C2	.05	200	39001-17	P288-05	DF-503	PTE4S5		2TM-S5	AVC Filter
C3	39		C-137727-109	SI39	D6-390	5W5Q4	GP1K-39	1FM-44	Osc. Grid Cap.
C4	.03	200	39001-82	P688-03	DF-503	PTE6S3		6TM-S3	Osc. Anode Dec.
C5	.08	200	39001-85	P288-1	DF-104	PTE4P1		2TM-P1	Filament Bypass
C6	2000		C-144675-16	BPD-002	DD-202	1W5D2	801-002	29C2	IF Decoupling *
C7A	200		C-144675-10	SI200	D6-201		GP2K-200		Diode RF Filter
B	2000			BPD-002	DD-202		801-002		Audio Coupling
C	5000			BPD-005	DD-502		811-005	34C4	AF Amp. Screen
D	100			SI100	D6-101		GP1K-100		AF Amp. Plate
E	4000			BPD-004	DD-502		811-005		Audio Coupling
C8	2000		C-144675-16	BPD-002	DD-202	1W5D2	801-002	29C2	Output Plate
C9	.08	200	39001-85	P288-1	DF-104	PTE4P1		72P52	Line Isolation
C10	.047	400	39477-45	P488-047	DF-503	PTE4S5		4TM-S47	Line Filter

* Some models used .05MFD in this application. Mfgrs part # 39001-17.

CONTROLS

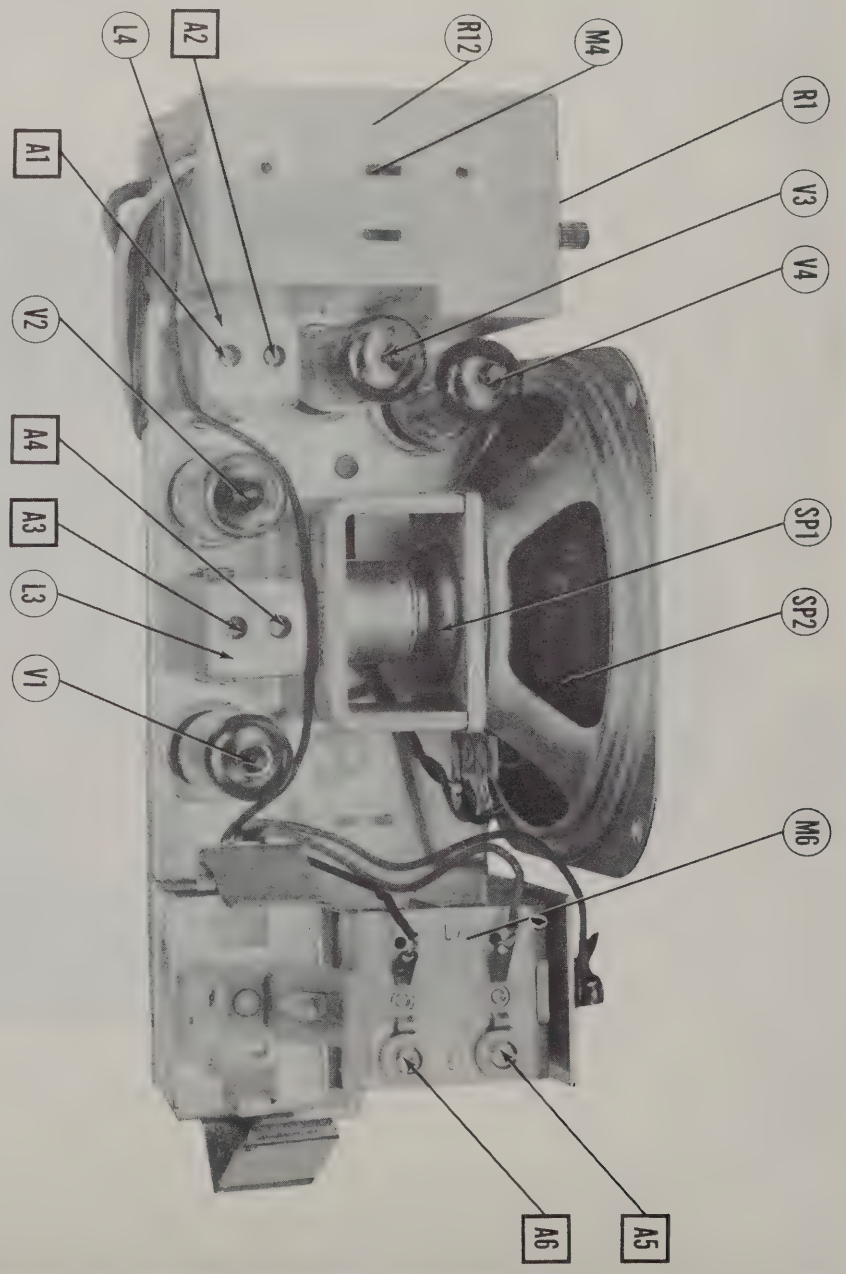
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	750KΩ	½	B-148240	Q11-137	AG-61-S		Volume control
B	Shaft		Not req.	Not req.	KSS-3		Attach to R1A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
R2	100KΩ	½	39373-74		Osc. Grid
R3	12KΩ	½	39374-38	BTS-12K	Osc. Anode Decoup
R4	2.2Meg	½	39373-97	BTS-2.2Meg	AGC Load - See Note
R5	6800Ω	½	39373-51	BTS-6800	IF Amp. Decoup
R6	100KΩ	½	39373-74	BTS-100K	Diode Filter
R7	3.3Meg	½	39373-100	BTS-3.3Meg	AGC Network
R8	10Meg	½	39373-107	BTS-10Meg	AF Amp. Grid
R9	1Meg	½	39374-61	BTS-1Meg	AF Amp. Plate
R10	3.3Meg	½	39373-100	BTS-3.3Meg	Output Grid
R11	330Ω	½	39374-19	BTS-330	Bias Network
R12	2200Ω	½	39373-40	BTS-2200	Filter
R13	1200Ω	½	39374-26	BTS-1200	Filament Dropping
R14	820Ω	½	39374-24	BTS-820	Filament Dropping
R15	2200Ω	½	39373-40	BTS-2200	Filament Dropping
R16	2220Ω	7	B-144857-4		Filament Dropping - Wire Wound
R17	82Ω	2	39374-188		Surge Limiter
R18	4.7Meg	½	39374-77	BTS-4.7Meg	AF Amp. Screen

Note - Early production models use 1meg resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	8.9KΩ	4.3Ω	750Ω	.5Ω	B148328	A-3329	A-2937	R0-304 ①	Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CROSLEY PART No.	VIKING PART No.	QUAM PART No.	
	FIELD	V.C. IMP.				
SP1	PM	4.3Ω	C148852	4J4	4A1	
	CONE. DIA.	V.C. DIA.				
SP2	4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CROSLEY PART No.	MEISSNER PART No.	
L1A	Loop Antenna	3.4Ω		148875		Model 11-301U Includes Lid, Salvador Blue
B	Loop Antenna	3.4Ω		148876		Model 11-302U, Includes Lid, Sea
C	Loop Antenna	3.4Ω		148877		Model 11-303U, Includes Lid, Sport Biege
D	Loop Antenna	3.4Ω		148878		Model 11-304U, Includes Lid, Tan
E	Loop Antenna	3.4Ω		148879		Model 11-305U, Includes Lid, Ebony
L2	Osc. Coil	3.2Ω	9Ω	AW-148420		
L3	1st IF	25Ω	25Ω	C-148449		
L4	2nd IF	25Ω	25Ω	C-148449		

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	CROSLEY PART No.	SYLVANIA PART No.	SELETRON PART No.	
M1	.065A	W145429	NB-5	5M4	

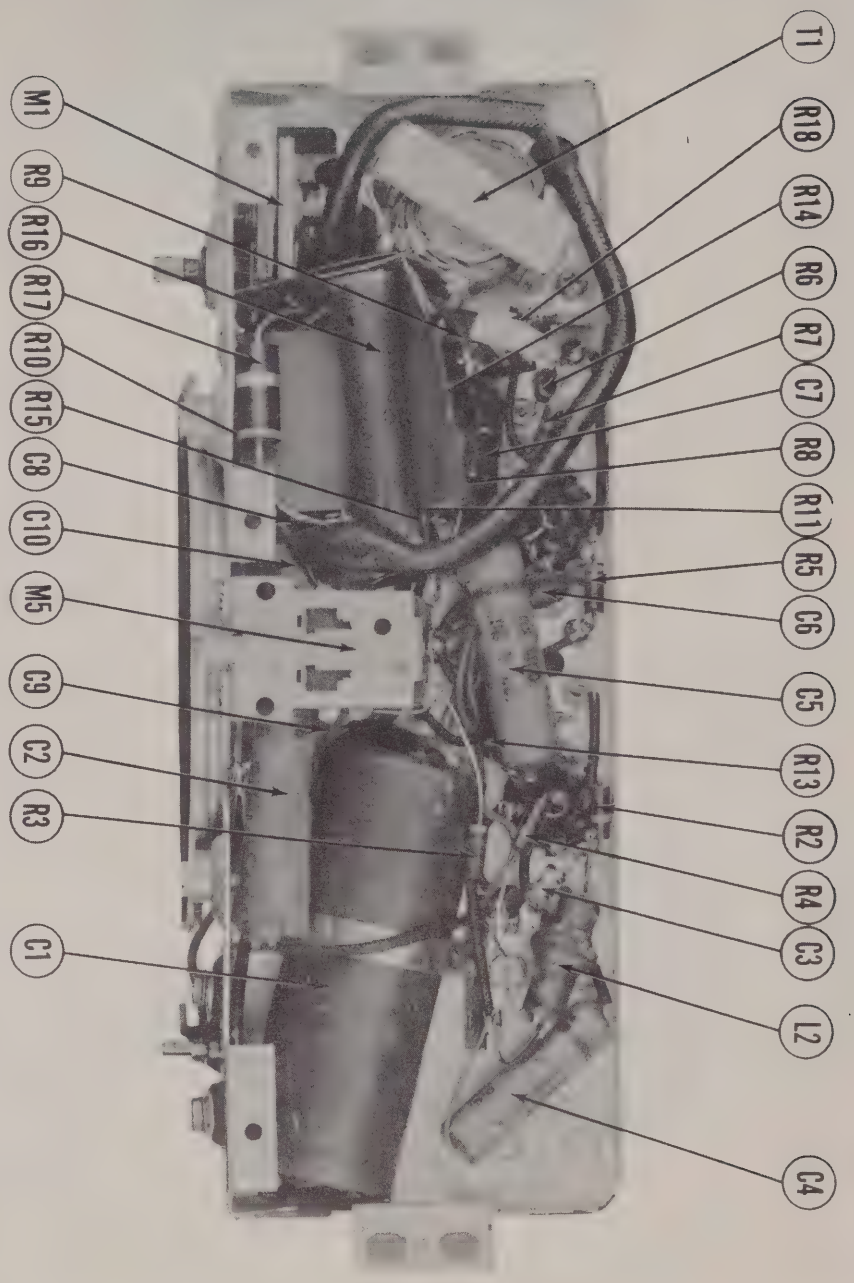
BATTERIES

ITEM No.	VOLTAGE	CROSLEY PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	1.5V "A"		950			2R			
M3	67.5V "B"	CR-88		467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M4	Switch	B-148330	AC/DC Battery
M5	Switch	B-148392	On-Off
M6	2 Gang Var. Cap.	B-148204	(14-320MMF, 20-153MMF)
	Dial Pointer	AW-148424	

CHASSIS—BOTTOM VIEW



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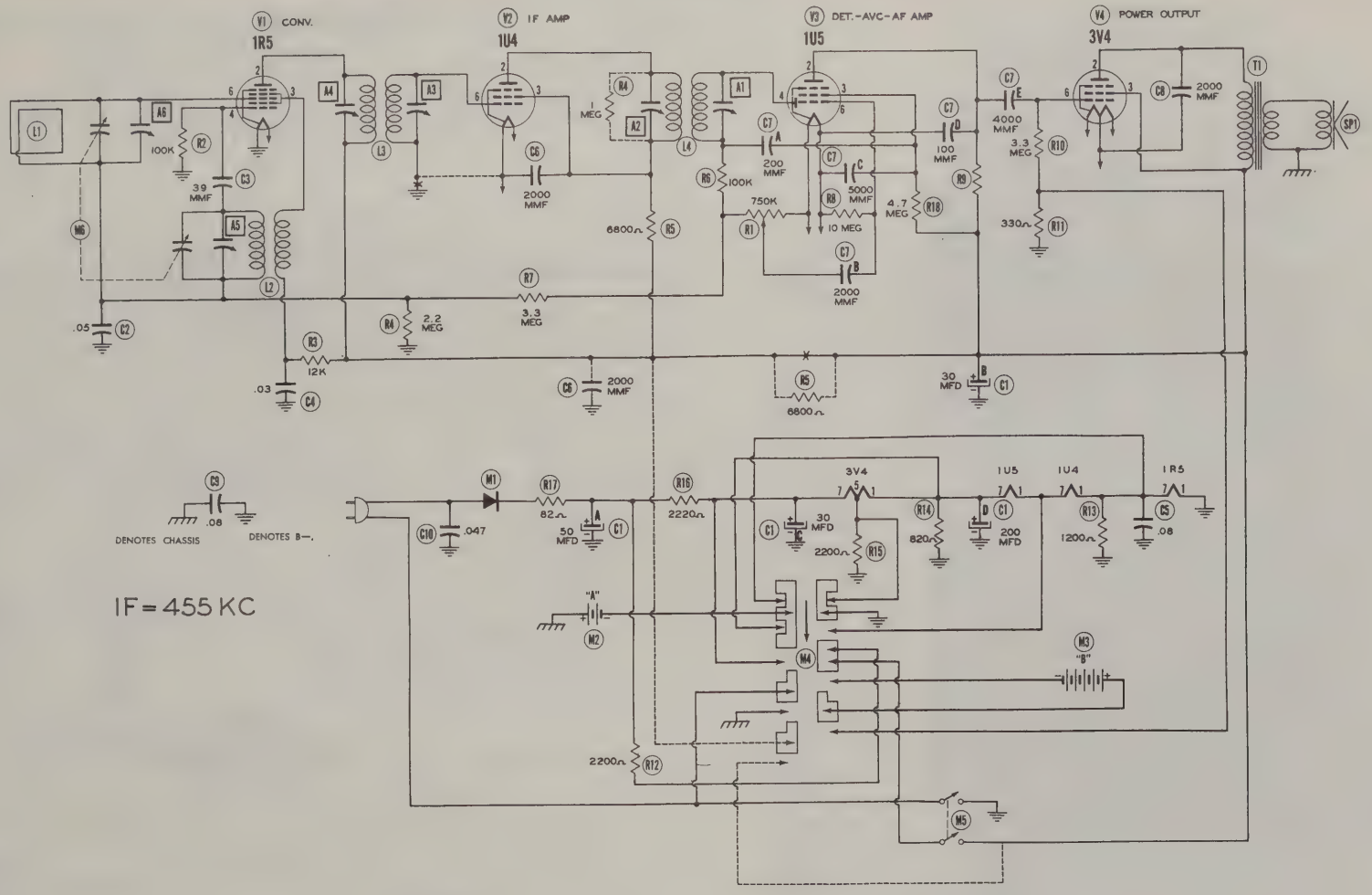
SET 124 FOLDER 3

CROSLEY MODEL 11-301U

CROSLEY MODEL 11-301U



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	0V	80VDC	55VDC	8-11VDC	0V	.1VDC	1.2VDC
V 2	1U4	1.2VDC	75VDC	75VDC	.1VDC	1.2VDC	0V	2.4VDC
V 3	1U5	2.4VDC	10VDC	4.4VDC	.7VDC	0V	.1VDC	4VDC
V 4	3V4	4VDC	78VDC ~	80VDC	0V	5.5VDC	0V	7VDC

‡ TAKEN WITH VACUUM TUBE VOLTMETER

V & R TAKEN IN AC-DC POSITION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†2.2KΩ	†14KΩ	100KΩ	*	1.5Meg	*
V 2	1U4	*	†9KΩ	†9KΩ	1.5Meg	*	25Ω	*
V 3	1U5	*	†1Meg	†4.2Meg	700KΩ	0Ω	10Meg	*
V 4	3V4	*	†3KΩ	†2.2KΩ	35Ω	*	3.3Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE

† MEASURED FROM OUTPUT OF M1

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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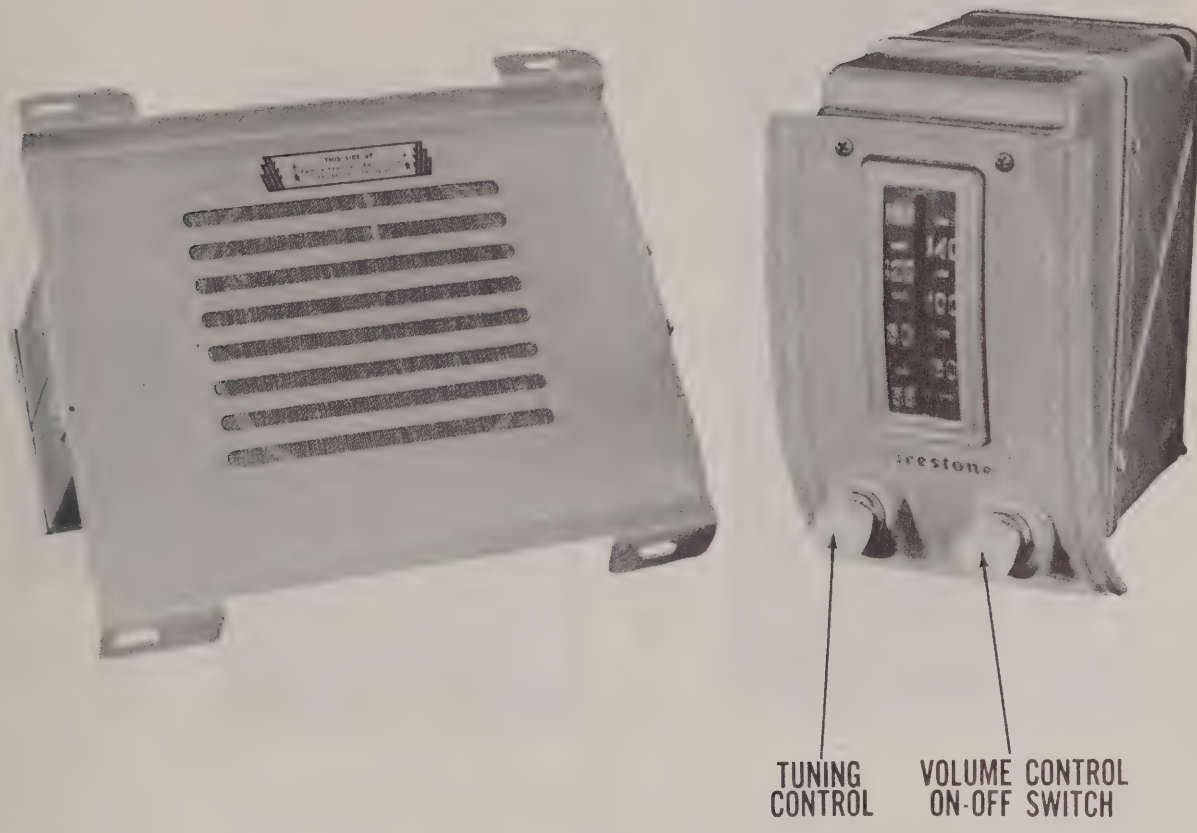
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIRESTONE
MODEL 4-B-57



FIRESTONE
MODEL 4-B-57

FIRESTONE MODEL 4-B-57

TRADE NAME	Firestone Model 4-B-57
SUPPLIER	Firestone Tire and Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Battery Operated Custom Built Automotive Superheterodyne Receiver
TUBES (SIX)	Types 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AT6 Det.-AVC-AF, 6AQ5 Power Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.5 Amp. at 6 Volts DC
TUNING RANGE—BROADCAST	538-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning gang fully closed and set lower edge of pointer carriage 1 3/8" from top edge of chassis. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400 ∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	100MMF	High side to antenna lead. Low side to chassis.	1600KC	"	"	A5	"
3.	100MMF	"	1400KC	Tune for max. output.	"	A6, A7	"
4.	100MMF	"	600KC	"	"	A8, A9 A10	"

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PARTS LIST AND DESCRIPTIONS

FIRESTONE MODEL 4-B-57

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BA6	6BA6	7BK	
V4	Det. -AVC-AF	6AT6	6AT6	7BT	
V5	Power Output	6AQ5	6AQ5	7BZ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	20	350	CE-86	AF64H4A		UP2235C		TVL-3636	■ Filter
B	20	350							▲ Filter
C	20	25							Output Cathode
C2	.05	200	C207	P285-05		PTE4S5		68P16	AVC Filter
C3	.05	200	C207	P285-05		PTE4S5		68P16	AVC Filter
C4	.05	200	C207	P285-05		PTE4S5		68P16	Decoupling
C5	100		CC200	SI100	D6-101	5W5T1	GP1K-100	19C11	Osc. Grid Cap.
C6	.1	400	C210	P488-1		PTE4P1		4TM-P1	RF Bypass *
C7	.05	200	C207	P285-05		PTE4S5		68P16	Decoupling *
C8	200		CC210	SI100	D6-201	5W5T2	GP2K-200	19C30	Diode RF Filter
C9	.01	600		P485-01	D6-103	PTE6S1	821-01	68P33	Audio Coupling †
C10	200		CC210	SI200	D6-201	5W5T2	GP2K-200	19C30	AF Amp. Grid *
C11	200		CC210	SI200	D6-201	5W5T2	GP2K-200	19C30	AF Amp. Plate
C12	.01	600	C206	P485-01	D6-103	PTE6S1	821-01	68P33	Audio Coupling
C13	.5	100	C209					68P20	Hash Filter
C14	.02	600		P688-02		PTE6S2		6TM-S2	Output Plate ‡
C15	.008	1600	C205	P1688-0075		PTE16D8		MB-D8	Buffer
C16	.5	100	C209					68P20	Hash Filter

* Not used in all models.
† Some models use .002MFD in this application.
‡ Some models use .01MFD in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	750KΩ	½	RV-300	Q13-137			Volume control
B	Sleeve						
	Bushing		Not req.	S-5 *			Attach to R1A per instructions
C	Switch		Not req.	76-1			Attach to R1A per instructions.

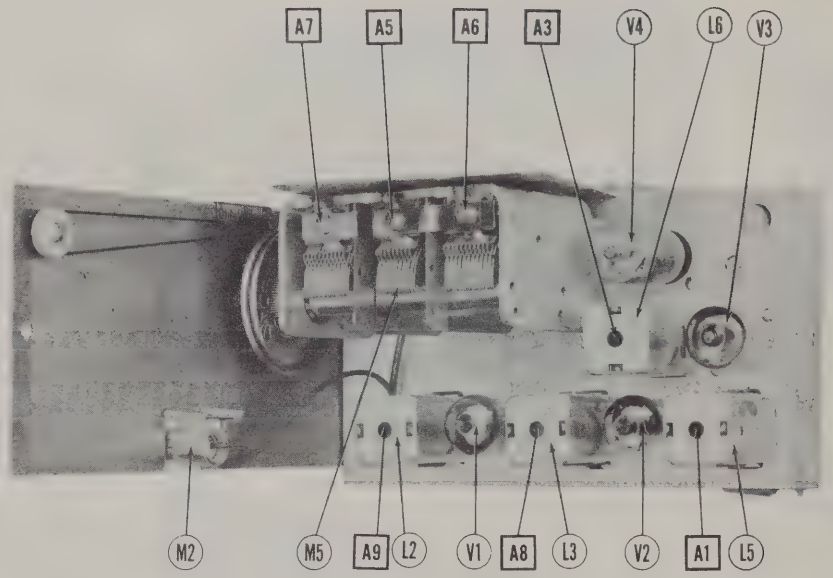
* Cut sleeve bushing to desired length to duplicate original.

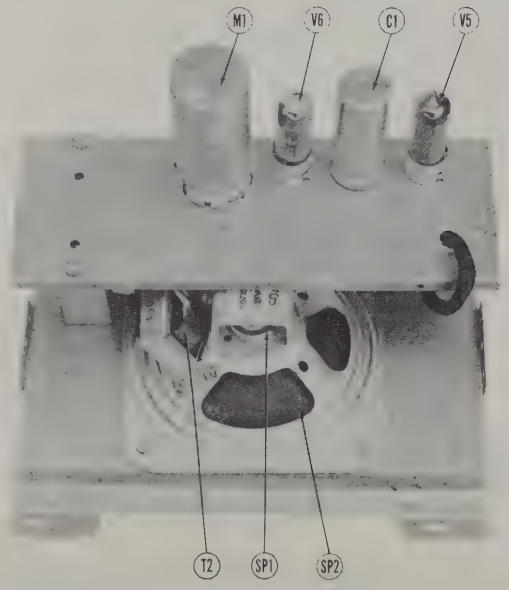
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	1Meg	½	R309	BTS-1Meg	AVC Network
R3	20KΩ	½	R306	BTS-22K	Osc. Grid
R4	820Ω	½		BTS-820	IF Amp. Cathode - See Note 1
R5	20KΩ	2	R313	BT-2-22K	Screen Dropping
R6	2Meg	½	R310	BTS-2Meg	AVC Network
R7	10Meg	½	R311	BTS-10Meg	AF Amp. Grid
R8	240KΩ	½		BTS-220K	AF Amp. Plate - See Note 2
R9	510KΩ	½	R308	BTS-470K	Output Grid
R10	330Ω	½	R303	BW-1-330	Output Cathode
R11	1000Ω	1	R312	BTA-1000	Filter
R12	100Ω	½	R301	BW-½-100	Hash Suppression
R13	100Ω	½	R301	BW-½-100	Hash Suppression
R14	1000Ω	½		BTS-1000	RF Amp. Cathode - See Note 3

Note 1. Some models use 1500Ω resistor in this application.
Note 2. Some models use a 250KΩ resistor in this application.
Note 3. Not used in all models.

CHASSIS—TOP VIEW





PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	6VDC @ 3A	425VCT .038ADC			TV-100		P-2970	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	4800Ω	3.4Ω	400Ω	.7Ω	Part of SP1	A-3877	A-2930	R0-8	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	V.C. IMP.	FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	3.4Ω	PM-705	ST-105 ① MOD. P5-X	52A21 ①	① Remount output transformer
	CONE DIA.	V. C. DIA.				
SP2	5"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	
L1	Ant. Loading	2Ω		L200		Includes capacitor used as coil form
L2	Ant. Coil	14.5Ω	5Ω	57FB-3		
L3	RF Coil	90Ω	7.5Ω	57BB-4		
L4	Osc. Coil	10Ω		L201		Tap at 1.2Ω
L5	1st IF	21Ω	21Ω	1655-16		
L6	2nd IF	21Ω	21Ω	1655-16		
L7	Hash Choke	0Ω		L203		
L8	Hash Choke	.2Ω		L202		

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				INSTALLATION NOTES
				FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	RADIART PART No.	
M1	Int.	6VDC	115 ∿	V-83	A-100	5301	5301	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					FIRESTONE PART No.		
M2	Bayonet	6-8	.15	Brown	T51		Type #47

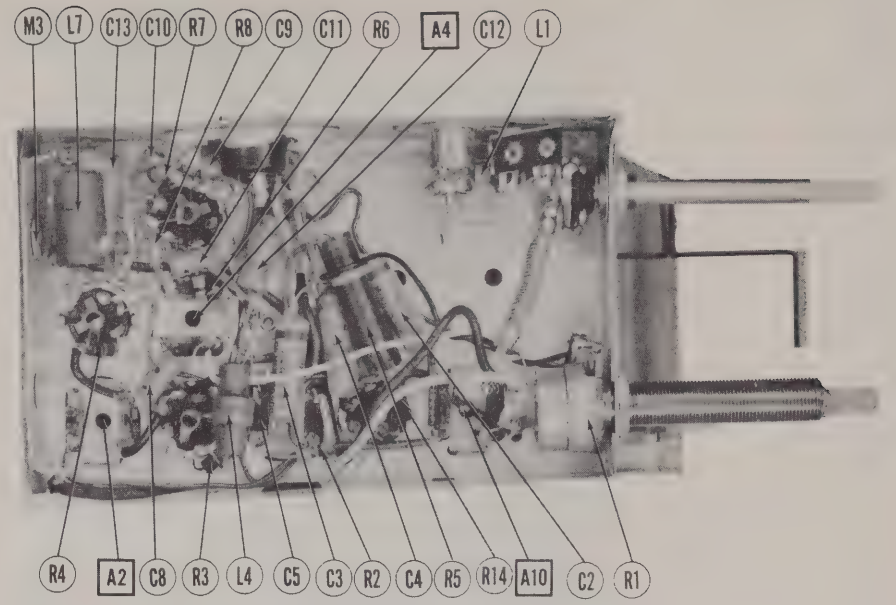
FUSES

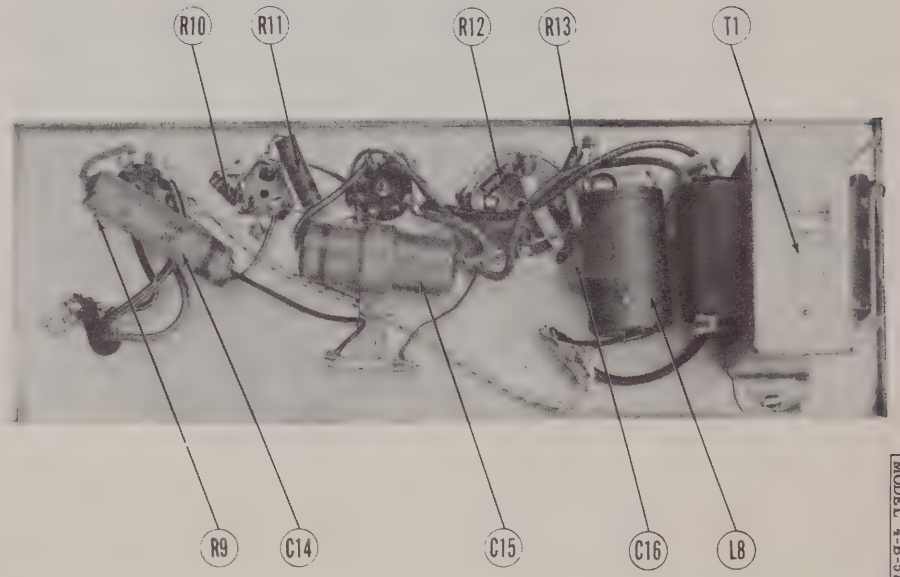
ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			FIRESTONE PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M4	SFE	15A	A201		307014		

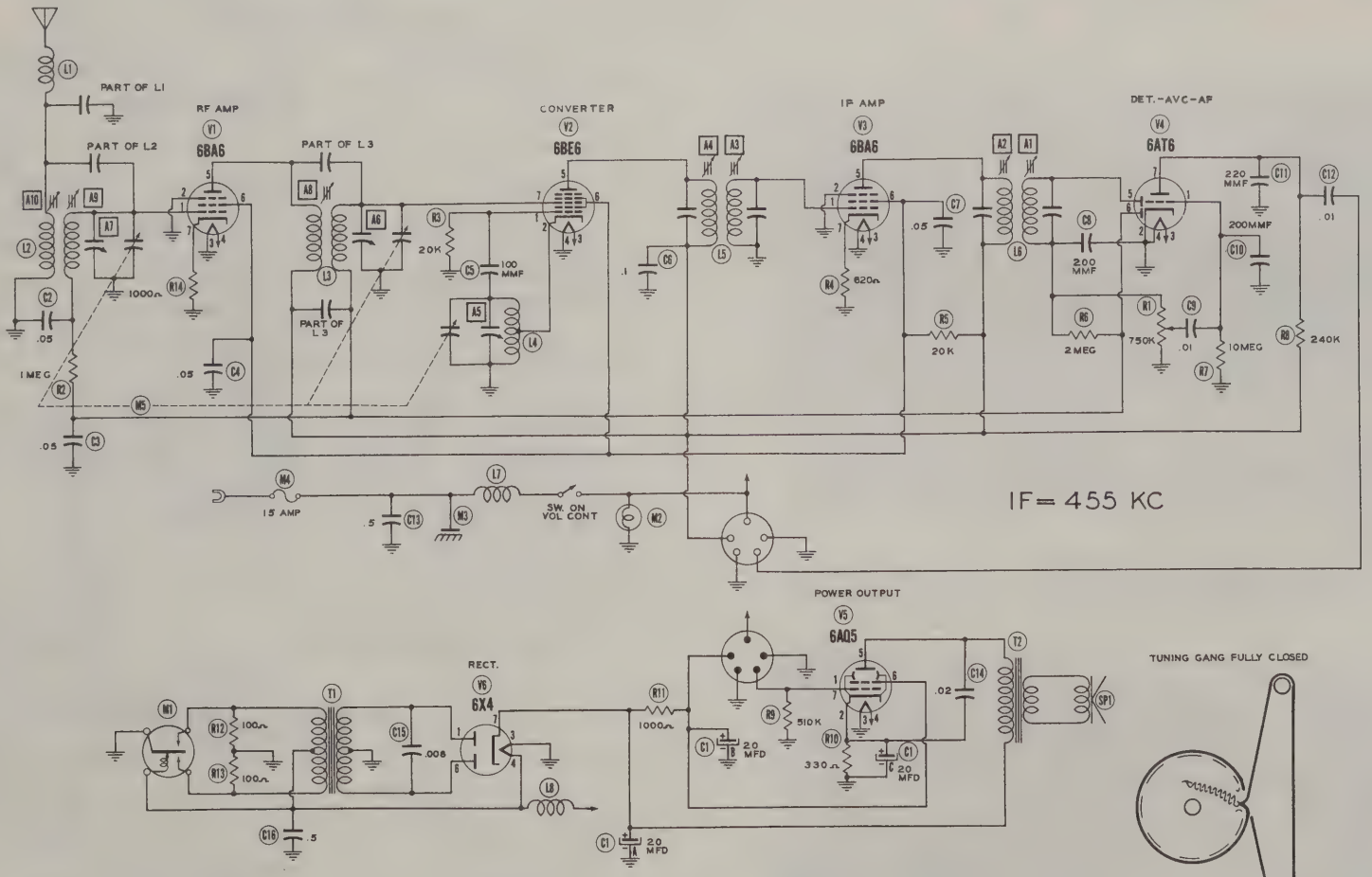
MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Spark Plate		
M5	3 Gang Var. Cap.	CV-300	(20-402MMF, 16-403MMF, 33-217MMF)
	Dial Scale	D300	
	Dial Pointer	PS300	
	Knob	H310	

CHASSIS—BOTTOM VIEW







VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	-.1VDC	0V	0V	6.3VDC	210VDC	70VDC	2.7VDC
V 2	6BE6	3-6.5VDC	0V	6.3VDC	0V	210VDC	70VDC	-.5VDC
V 3	6BA6	0V	0V	6.3VDC	0V	210VDC	70VDC	2.6VDC
V 4	6AT6	-.6VDC	0V	6.3VDC	0V	-.5VDC	-.5VDC	75VDC
V 5	6AQ5	0V	10VDC	0V	6.3VDC	220VDC	210VDC	0V
V 6	6X4	270VAC	0V	0V	6.3VDC	0V	270VAC	240VDC

‡ TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	3.7Meg	0Ω	0Ω	.1Ω	†1000Ω	†21KΩ	1000Ω
V 2	6BE6	20KΩ	1.2Ω	.1Ω	0Ω	†1000Ω	†21KΩ	2.7Meg
V 3	6BA6	22Ω	0Ω	.1Ω	0Ω	†1000Ω	†21KΩ	820Ω
V 4	6AT6	10Meg	0Ω	.1Ω	0Ω	750KΩ	2.7Meg	†240KΩ
V 5	6AQ5	510KΩ	330Ω	0Ω	.1Ω	†400Ω	†1000Ω	510KΩ
V 6	6X4	380Ω	Inf.	0Ω	.1Ω	Inf.	400Ω	7KΩ

MEASURED FROM PIN 7 OF V6

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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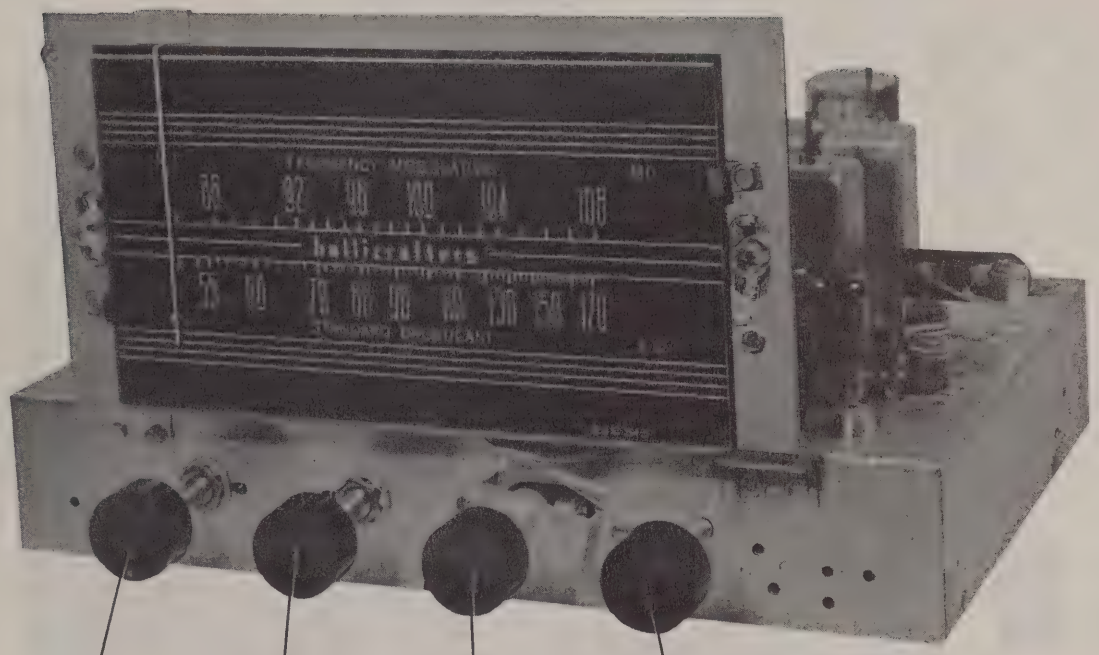
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6 volts for volt readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

HALLICRAFTERS
MODEL S-78



HALLICRAFTERS
MODEL S-78

HALLICRAFTERS MODEL S-78

TRADE NAME	Hallicrafters Model S-78
MANUFACTURER	The Hallicrafters Co., 5th and Kostner Avenues, Chicago 24, Illinois
TYPE SET	AC Operated AM-FM Superheterodyne Receiver
TUBES (ELEVEN)	Types 6AU6 FM RF Amp., 6BA6 Mixer, 6J6 Oscillator, 6BA6 1st IF Amp., 6SH7 2nd IF Amp., 6SH7 Det.-AVC-Limiter, 6H6 FM Det., 6SJ7 AF Amp.,(2) 6K6GT Power Output, 5Y3GT Rectifier
POWER SUPPLY	105-125 Volts AC — RATING .75 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1750KC — FREQ. MOD. 88-108 MC

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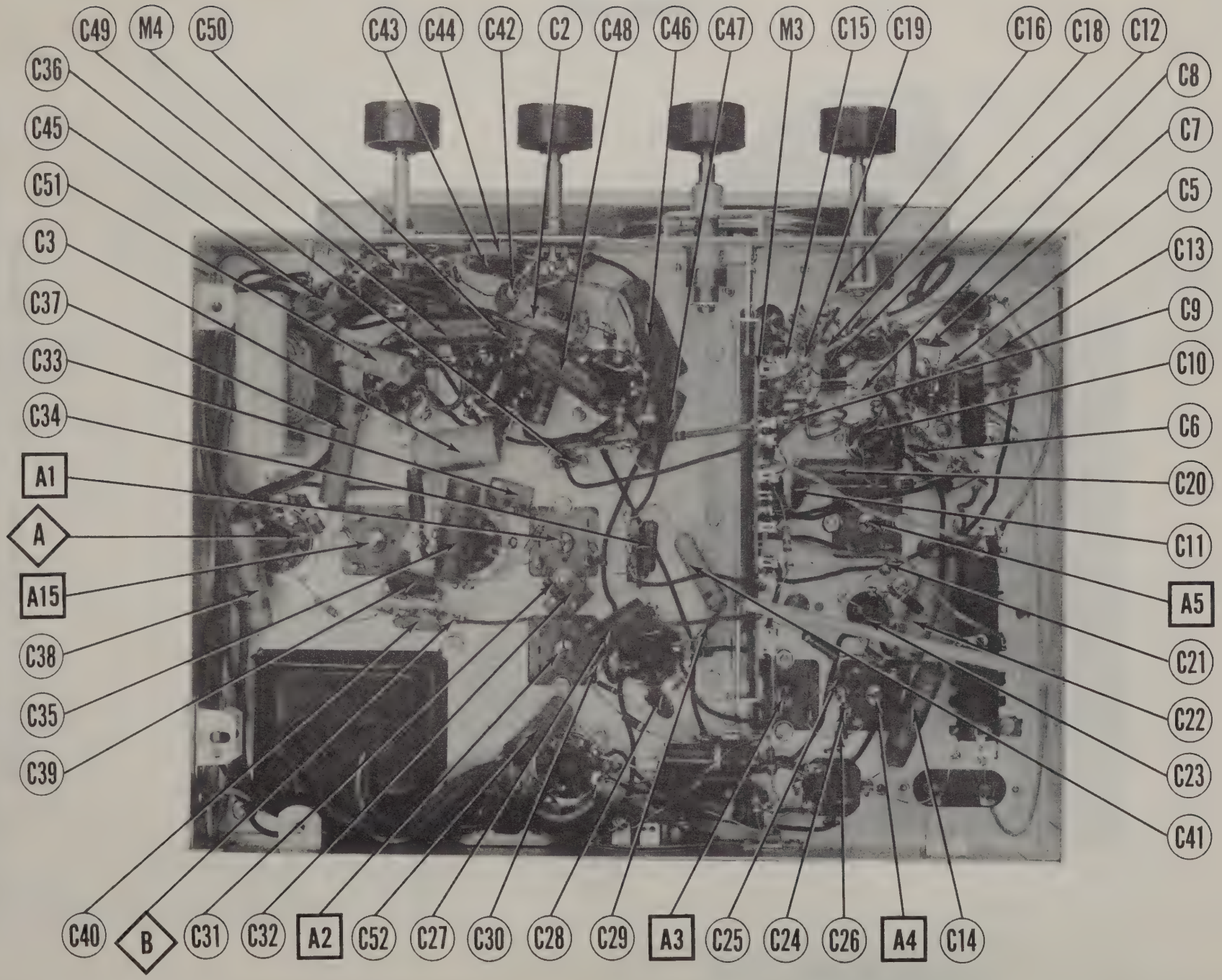
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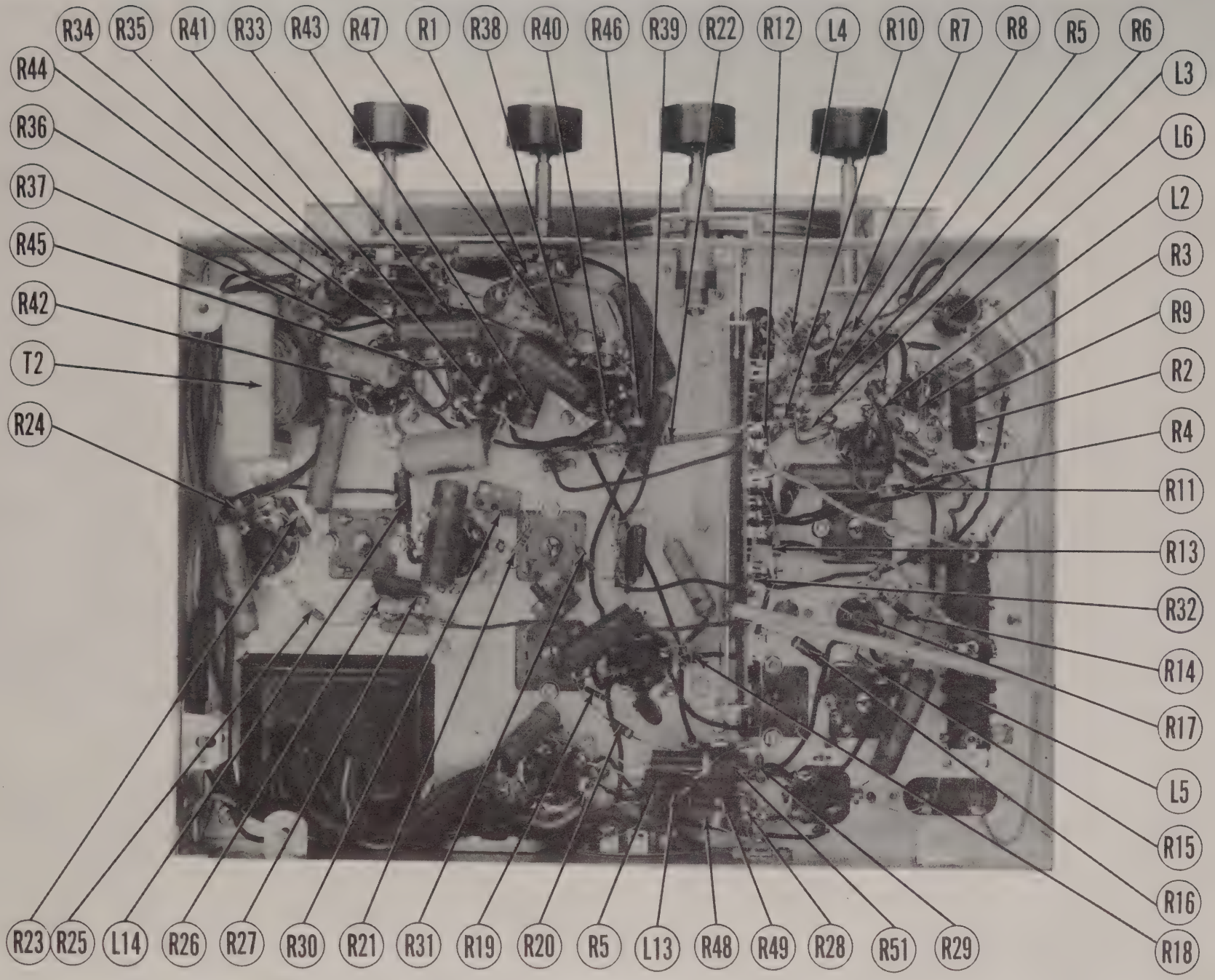
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R5
R6
R44
R36
R37
R45
R42
T2
R24
L3
L6
L2
R3
R9
R2
R4
R11
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R32
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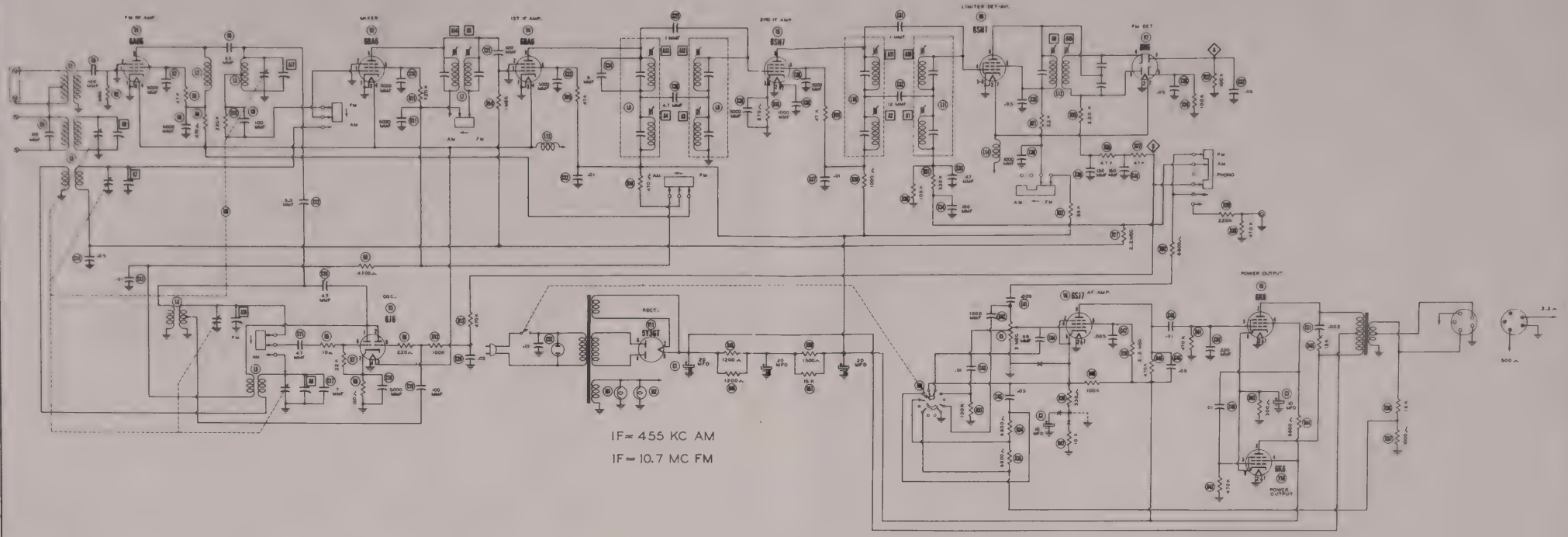

IF = 455 KC AM

IF = 10.7 MC FM

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AU6	-.7VDC	0V	0V	6.3VAC	†210VDC ≏0V	†100VDC ≏0V	0V	
V 2	6BA6	‡-.6VDC ≏-1.4VDC	0V	0V	6.3VAC	†215VDC ≏230VDC	†40VDC ≏45VDC	0V	
V 3	6J6	‡135VDC ≏150VDC	‡135VDC ≏150VDC	6.3VAC	0V	†.1VDC ≏0V	‡‡-.5VDC ≏‡-5.5VDC	2.4VDC	
V 4	6BA6	-.6VDC	0V	0V	6.3VAC	‡225VDC ≏235VDC	‡80VDC ≏90VDC	0V	
V 5	6SH7	0V	0V	2VDC	0V	2VDC	‡130VDC ≏140VDC	6.3VAC	‡215VDC ≏230VDC
V 6	6SH7	0V	0V	0V	†-.5VDC ≏-.7VDC	0V	†40VDC ≏0V	6.3VAC	†40VDC ≏0V
V 7	6H6	0V	0V	‡-1.3VDC	‡-.4VDC	‡-.6VDC	0V	6.3VAC	‡1.3VDC
V 8	6SJ7	0V	0V	15VDC	1.2VDC	15VDC	†29VDC ≏33VDC	6.3VAC	†43VDC ≏48VDC
V 9	6K6GT	0V	0V	310VDC	†205VDC ≏215VDC	0V	0V	6.3VAC	‡15VDC ≏17VDC
V 10	6K6GT	0V	0V	310VDC	†225VDC ≏235VDC	0V	315VDC	6.3VAC	‡15VDC ≏17VDC
V 11	5Y3GT	‡275VDC ≏285VDC	315VDC	0V	320VAC	0V	320VAC	0V	315VDC

TONE SWITCH IN VOICE POSITION(POSITION 2)
† TAKEN IN FM POSITION
≏ TAKEN IN AM POSITION
‡ TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AU6	1 Meg.	0Ω	0Ω	.2Ω	‡‡2.2KΩ ≏Inf.	‡‡50KΩ ≏Inf.	0Ω	
V 2	6BA6	‡220KΩ ≏2.5 Meg.	0Ω	0Ω	.2Ω	‡1.7KΩ	†220KΩ	0Ω	
V 3	6J6	†6.4KΩ	†6.4KΩ	.2Ω	0Ω	Inf.	22KΩ	150Ω	
V 4	6BA6	3.6 Meg.	0Ω	0Ω	.2Ω	‡1.3KΩ	†48KΩ	0Ω	
V 5	6SH7	0Ω	0Ω	270Ω	9.2Ω	270Ω	†48KΩ	.1Ω	†2.3KΩ
V 6	6SH7	0Ω	0Ω	0Ω	100KΩ	0Ω	‡190KΩ ≏Inf.	.2Ω	†40KΩ ≏Inf.
V 7	6H6	0Ω	0Ω	100KΩ	Inf.	Inf.	Inf.	.2Ω	100KΩ
V 8	6SJ7	0Ω	0Ω	6KΩ	6KΩ	6KΩ	†2.2 Meg.	.1Ω	†470KΩ
V 9	6K6GT	Inf.	0Ω	†350Ω	†8KΩ	470KΩ	Inf.	.1Ω	300Ω
V 10	6K6GT	0Ω	0Ω	†350Ω	†1.3KΩ	470KΩ	†12KΩ	.1Ω	300Ω
V 11	5Y3GT	†800Ω	25KΩ	Inf.	100Ω	Inf.	100Ω	Inf.	25KΩ

TONE SWITCH IN VOICE POSITION (POSITION 2)
‡ TAKEN IN FM POSITION
≏ TAKEN IN AM POSITION
† MEASURED FROM PIN 2 OF V11

THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning gang fully closed and set pointer to the vertical line at the extreme left hand end of the dial scale. The RMA dummy consists of a 200MMF capacitor in series with a 20 microhenry choke which is shunted by a 400MMF capacitor in series with a 400Ω carbon resistor.

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

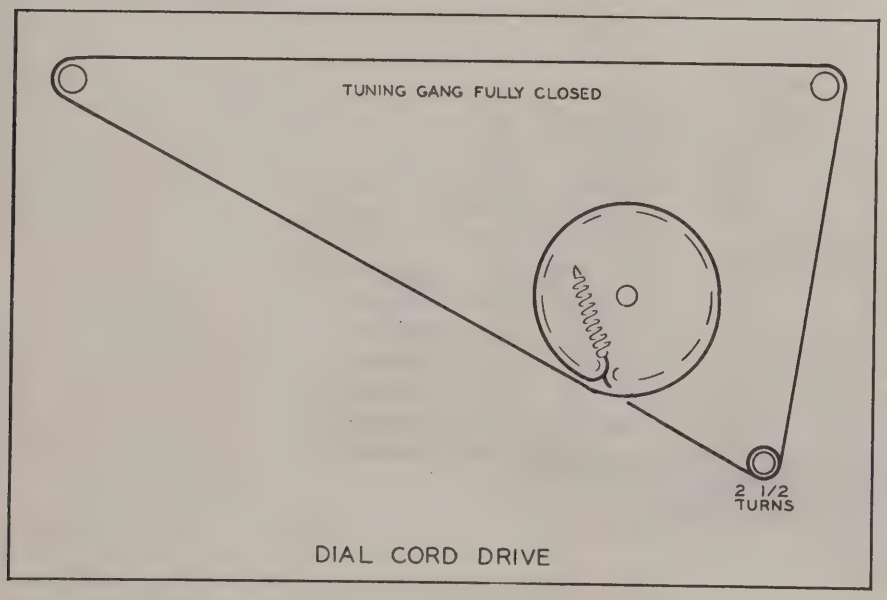
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to stator on center AM section of tuning gang. Low side to chassis.	455KC (400 ∿ Mod.)	BC (Center)	1000KC	Across voice coil	A1, A2, A3, A4, A5	Adjust for maximum output.
2.	RMA	High side to antenna terminal A. Low side to terminal G.	1500KC	"	1500KC	"	A6, A7, A8	"

FM IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	.01MFD in series with 4700Ω carbon resistors	High side thru dummy to stator on center FM section of tuning gang. Low side to chassis.	10.7MC	FM (counter clock-wise)	90MC	DC probe to point A. Common to chassis.	A9, A10, A 11, A12, A13, A14	Adjust for maximum deflection. Attenuate signal generator to maintain 2 volt reading.
4.	"	"	"	"	"	DC probe to point B . Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Two 150Ω carbon resistors	Across FM antenna terminals with 150Ω in each lead.	105MC (Unmod.)	FM	105MC	DC probe to point A. Common to chassis.	A16, A17	Adjust for maximum deflection.



DIAL CORD DRIVE

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

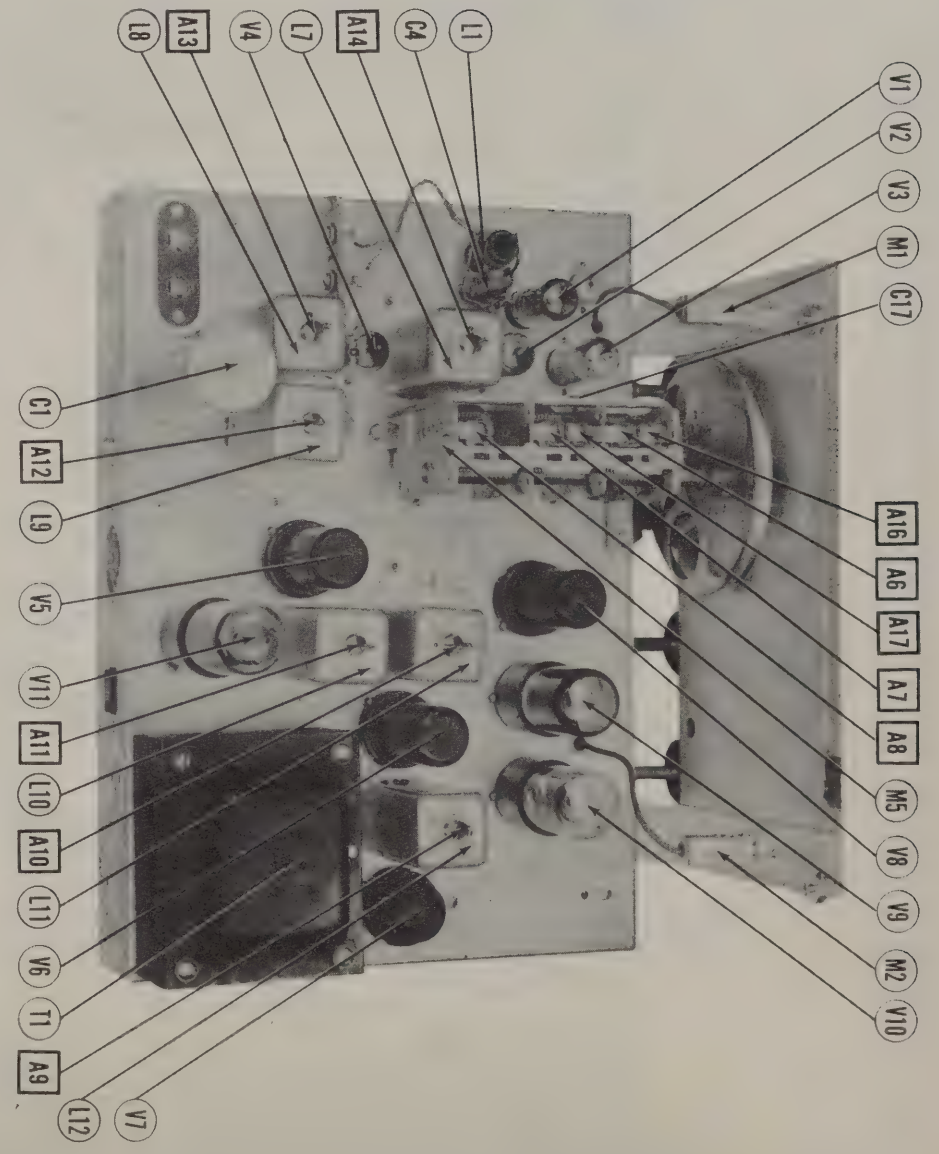
ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	FM RF Amp.	6AU6	6AU6	7BK	
V2	Mixer	6BA6	6BA6	5CE	
V3	Oscillator	6J6	6J6	7BF	
V4	1st IF Amp.	6BA6	6BA6	5CE	
V5	2nd IF Amp.	6SH7	6SH7	8BK	
V6	DET-AVC-Limiter	6SH7	6SH7	8BK	
V7	FM Det.	6H6	6H6	7Q	
V8	AF Amp.	6SJ7	6SJ7	8N	
V9	Power Output	6K6GT	6K6GT	7S	
V10	Power Output	6K6GT	6K6GT	7S	
V11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	60	450	45B113	AFH3666J		UPT62245		D13409	▲ Filter
B	20	450							■ Filter
C	20	400							▲ Filter
C2	10	25	45A121	PRS25/10		BR102A		TVA-1204	AF Amp. Cath. *
C3	10	25	45A121	PRS25/10		BR102A			Output Cath.
C4	100	500	CM20A101M	1468-0001	D6-101	5W5T1	GP1K-100	1FM-31	Fixed Trimmer
C5	100		47B20101M5	SI100	D6-100	5W5T1	GP1K-100	19C11	RF Coupling
C6	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Amp. Dec.
C7	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Amp. Screen
C8	33		CC20UK330K	SI33	D6-330	5W5Q4	GP1K-33		RF Coupling
C9	100		47B20101M5	SI100	D6-101	5W5T1	GP1K-100	19C11	RF Coupling
C10	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	Mixer Screen
C11	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C12	3.3		47A160-5	SI3.3NPO	TCZ-3.3		NPOK-3.3		Osc. Coupling
C13	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Osc. Plate Dec.
C14	.05	200	46AU503J	P288-05	DF-503	PTE4S5		2TM-S5	AVC Filter
C15	47		CC20UK470M	SI47N750	TCN-47	5W5Q5	N750L-47		Osc. Grid Cap.
C16	47		CC20UK470M	SI47N750	TCN-47	5W5Q5	N750L-47		Osc. Feedback
C17	7		CC20UK070K				N750K-7		Fixed Trimmer
C18	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	Osc. Cath.
C19	100		47B20101M5	SI100	D6-101	5W5T1	GP1K-100	19C11	AFC Coupling
C20	.02	200	46AU203M	P488-02	DF-203	PTE4S2		2TM-S2	AFC Filter
C21	100		47M2010M5	SI100					IF Coupling
C22	.01	600	46AZ103F	P688-01					RF Bypass
C23	5000		47A168	BPD-005					1st IF Screen
C24	5						N750K-5		Fixed Trimmer
C25	1		47A160-2		TCZ-1				IF Coupling
C26	4.7		47A160-6	SI4.7NPO	TCZ-4.7	5R5Q5	NPOK-4.7	MS-55	IF Coupling
C27	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	821-01	6TM-S1	2nd IF Dec.
C28	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	2nd IF Screen
C29	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	2nd IF Cath.
C30	1000		47B20102M5	SI1000	D6-102	1W5D1	GP2L-001	19C1	2nd IF Fil.
C31	1		47A160-2		TCZ-1				IF Coupling
C32	12	500	CM20A120K	SI12	D6-120		GP1K-12		IF Coupling
C33	47	500	CM20A470M	1468-00005	D6-470	5W5Q5	GP1K-47	1FM-45	Diode RF Filter
C34	150	500	CM20A151M	1468-00015	D6-151	5W5T15	GP2K-150	1FM-315	Diode RF Filter
C35	.05	600	46AY503J	P688-05	DF-503	PTE6S5		6TM-S5	Limiter Dec.
C36	1000		47B20102M5	SI1000	D6-102	1W5D1	GP2L-001	19C1	Limiter Dec.
C37	.05	200	46AU503J	P288-05	DF-503	PTE4S5		2TM-S5	Discr. Plate Byp.
C38	.05	200	46AU503J	P288-05	DF-503	PTE4S5		2TM-S5	Discr. Cath. Byp.
C39	150	500	CM20A151M	1468-00015	D6-151	5W5T15	GP2K-150	1FM-315	RF Bypass
C40	150	500	CM20A151M	1468-00015	D6-151	5W5T15	GP2K-150	1FM-315	RF Bypass
C41	.003	600	46AZ302J	P688-003	D6-302	PTE6D3	GP2M-003	6TM-D3	Audio Coupling
C42	1000		47B20102M5	SI1000	D6-102	1W5D1	GP2L-001	19C1	Tone Comp.
C43	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Tone Comp.
C44	68	500	CM20A680M	SI68	D6-680	5W5Q7	GP1K-68	MS-47	Tone Comp.
C45	.03	200	46AU303J	P688-03		PTE6S3		6TM-S3	Tone Comp.
C46	.05	600	46AY503J	P688-05	DF-503	PTE6S5		6TM-S5	AF Amp. Screen
C47	.005	600	46AZ502J	P688-005	D6-502	PTE6D5	811-005	6TM-D5	AF Amp. Screen
C48	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Audio Coupling
C49	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Audio Coupling

CHASSIS—TOP VIEW



PHOTOFACT* Folder

HALLICRAFTERS MODELS
810A, 811, 815, 818, 820, 822, 860, 861

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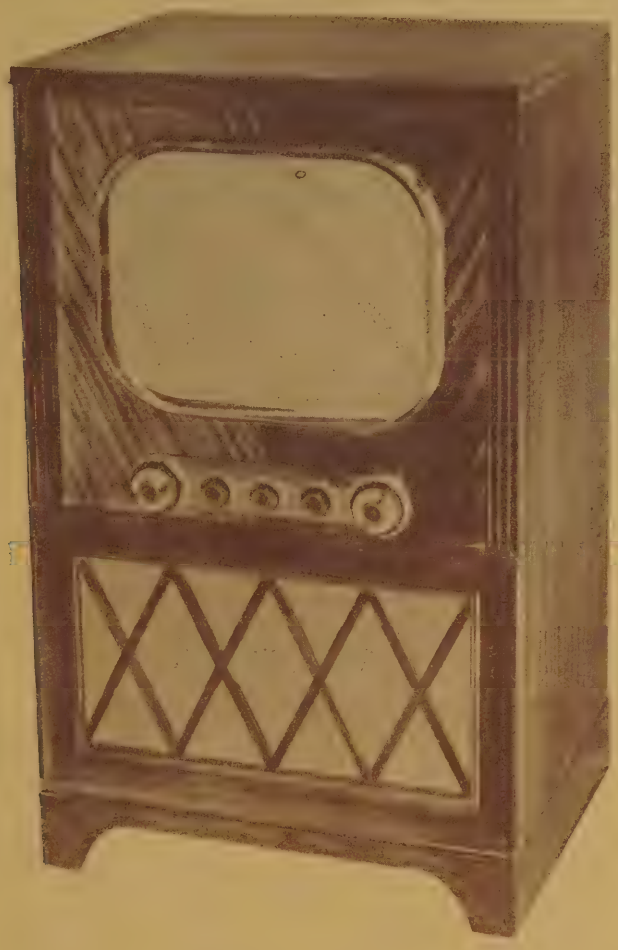
The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 818

HALLICRAFTERS MODELS
810A, 811, 815, 818, 820, 822, 860, 861

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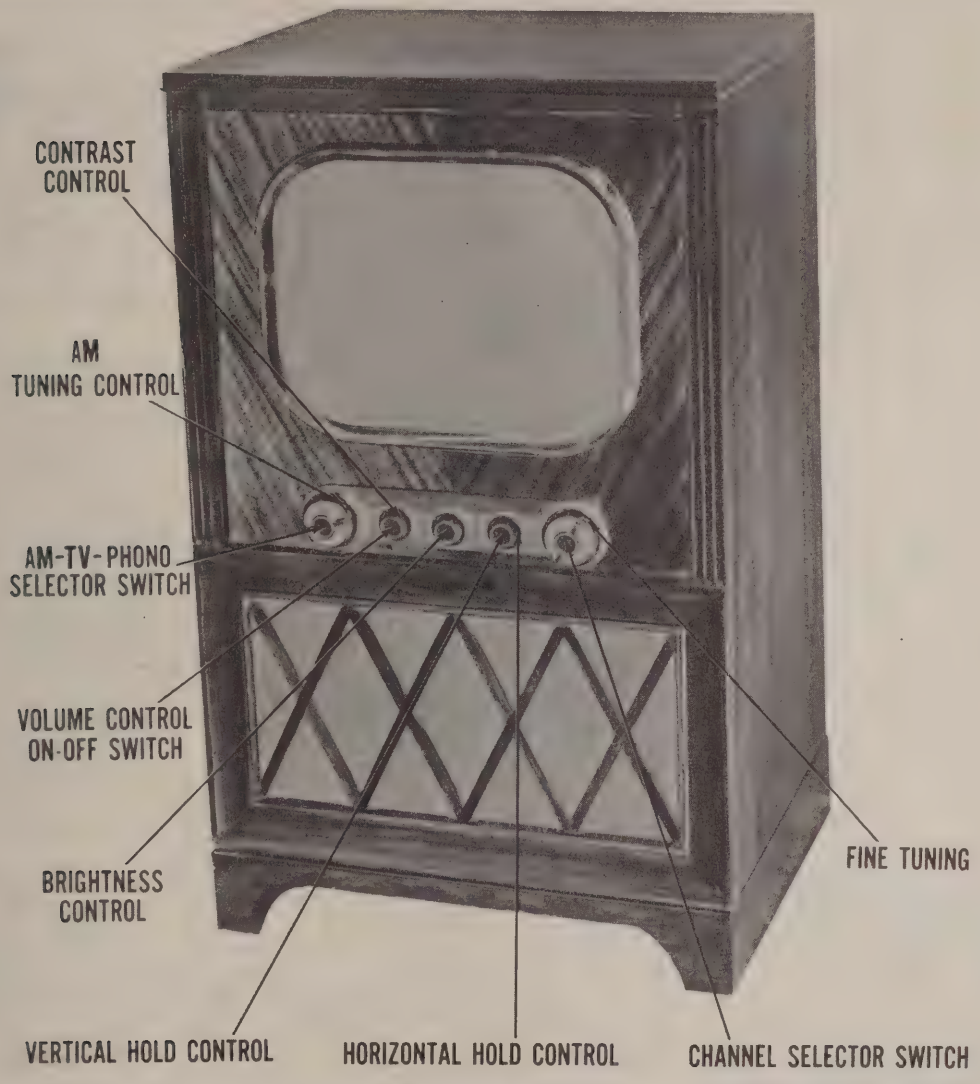
Date 2/51 Set No. 124—Folder No. 6



HALLICRAFTERS MODELS
810A, 811, 815, 818, 820, 822, 860, 861

HALLICRAFTERS MODEL 818

TRADE NAME	Hallicrafters, Models 810A, 811, 815, 818, 820, 822, 860, 861
MANUFACTURER	Hallicrafters Co., 5th and Kostner Ave., Chicago 24, Illinois
TYPE SET	TV-AM-Phono Combination Receiver (Some Models "TV Only")
TUBES	Twenty One (TV Only Receivers) Twenty Four (TV-AM Receivers)

POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 2.0 Amp. at 117 Volts AC

TUNING RANGE—TV-Channels 2 thru 13, AM-535-1620KC

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HOWARD W. SAMS & CO., INC. • Indianapolis 1, Indiana

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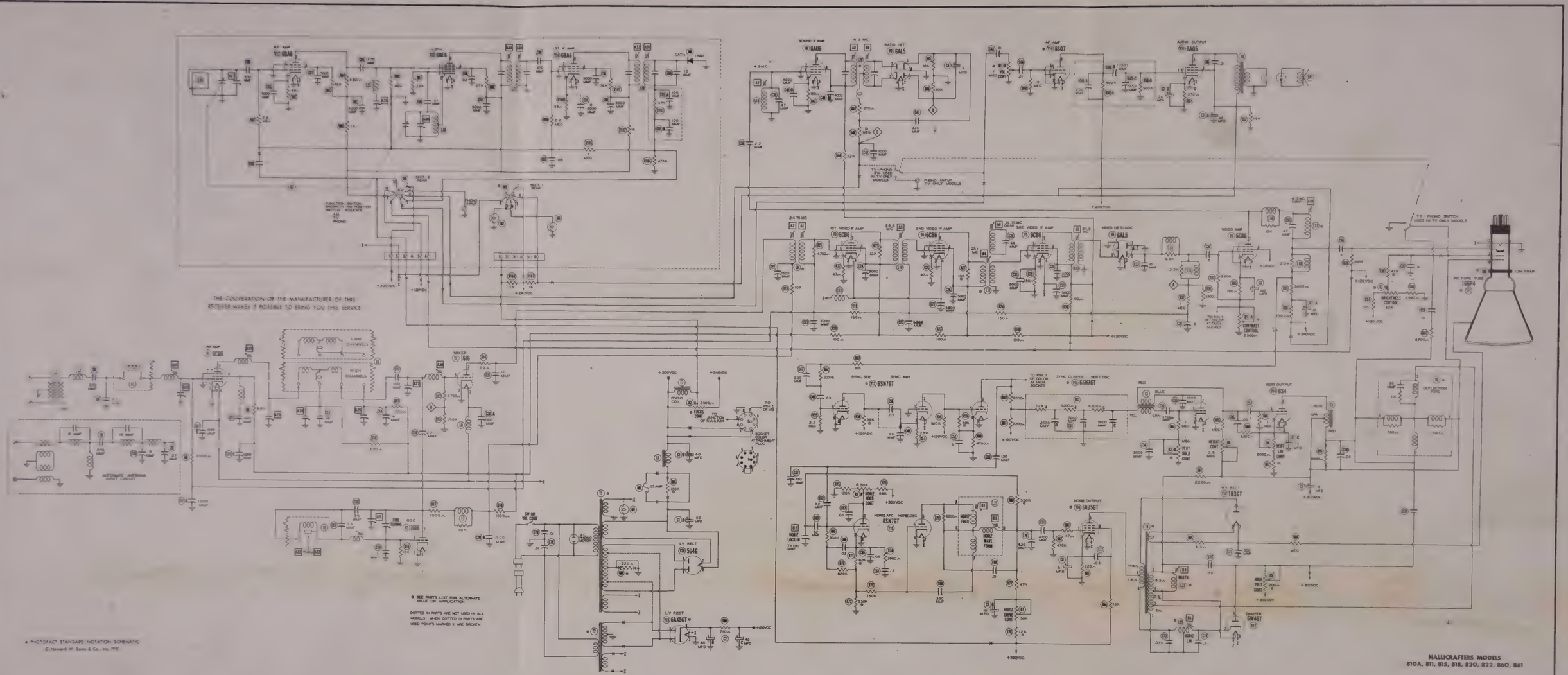
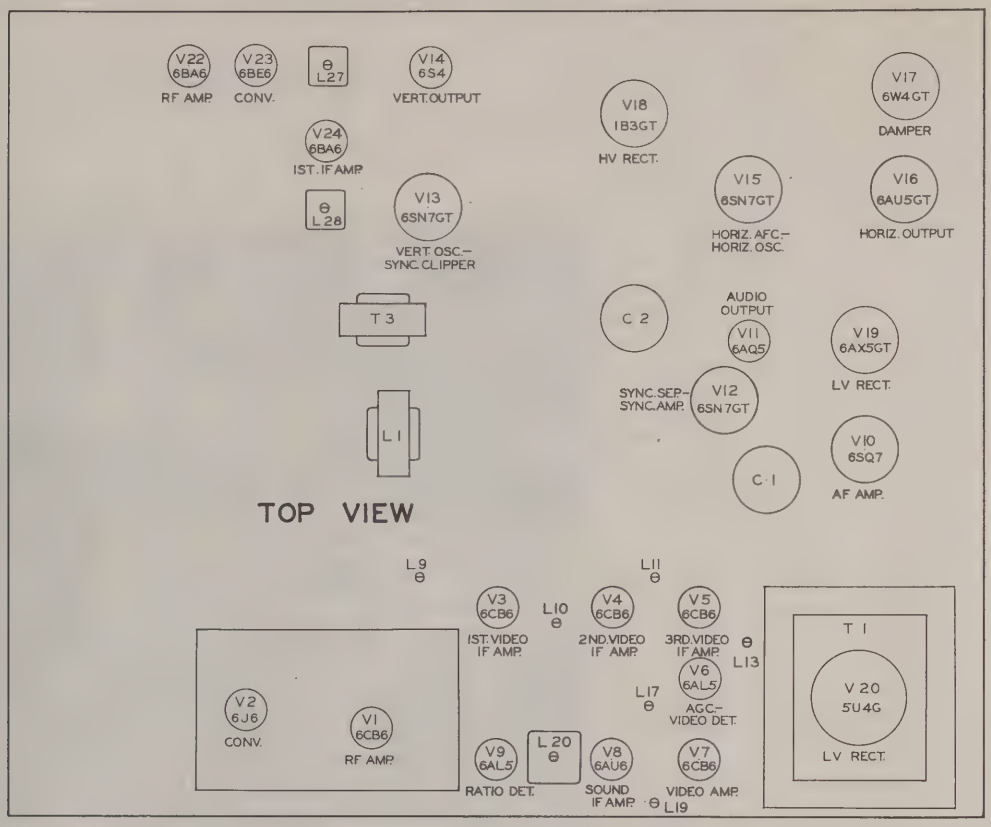
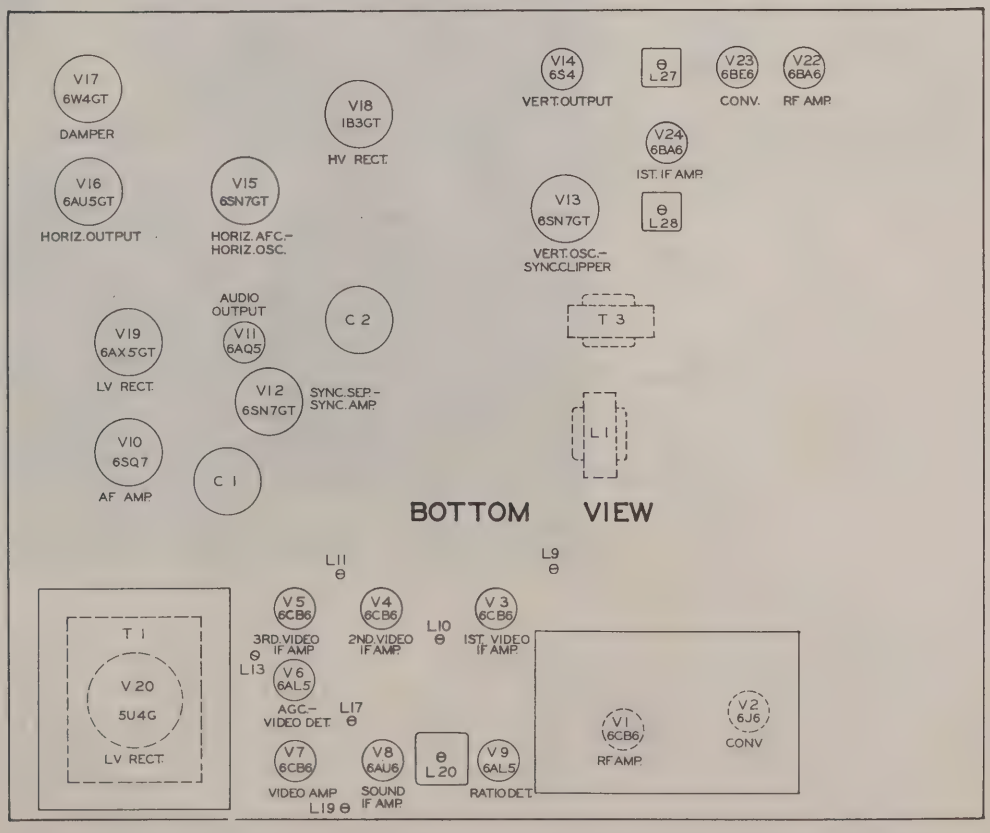
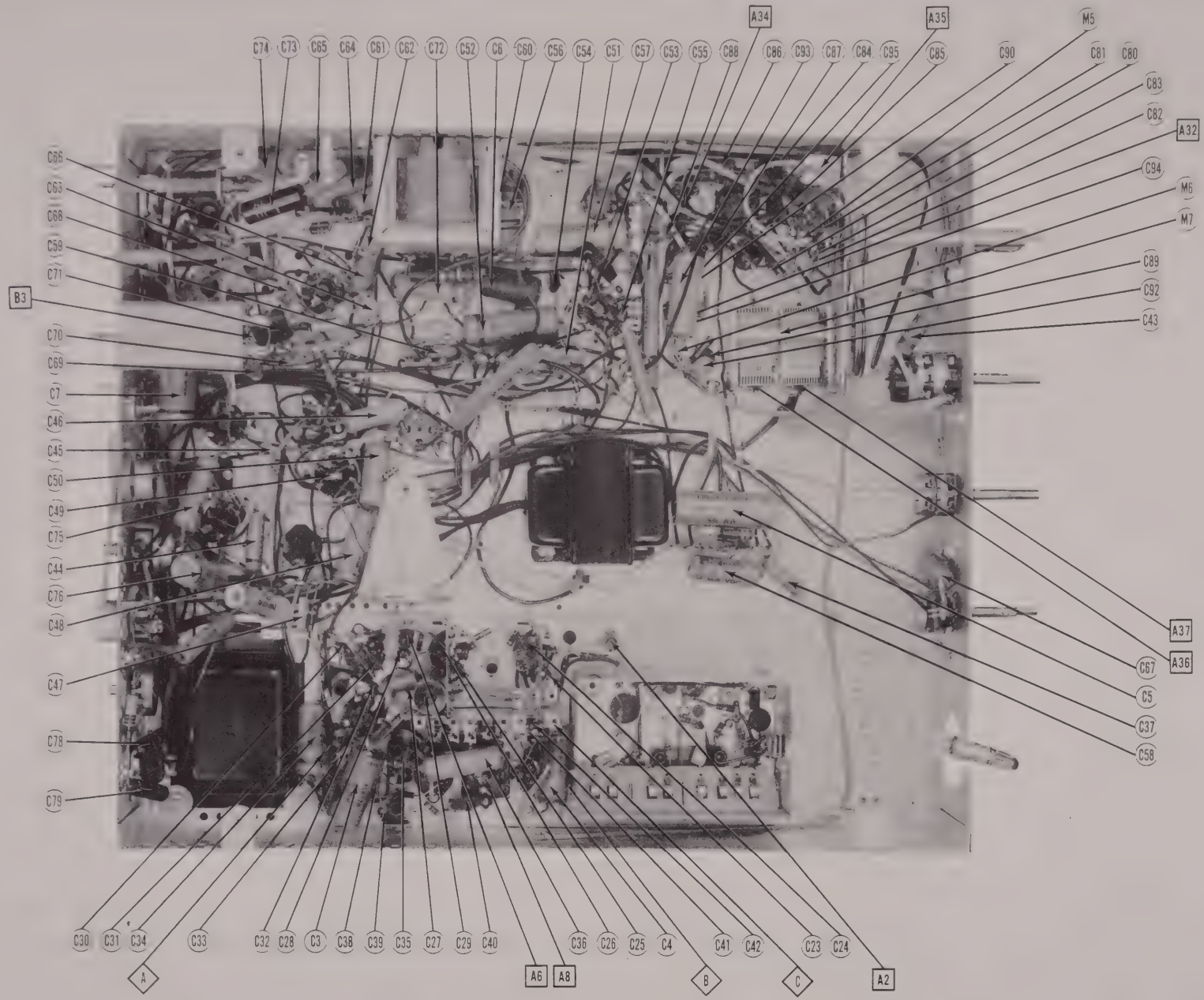

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
HALLICRAFTERS MODELS
810A, 811, 815, 818, 820, 822, 860, 861
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1951
* SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN

HALLICRAFTERS MODELS
810A, 811, 815, 818, 820, 822, 860, 861

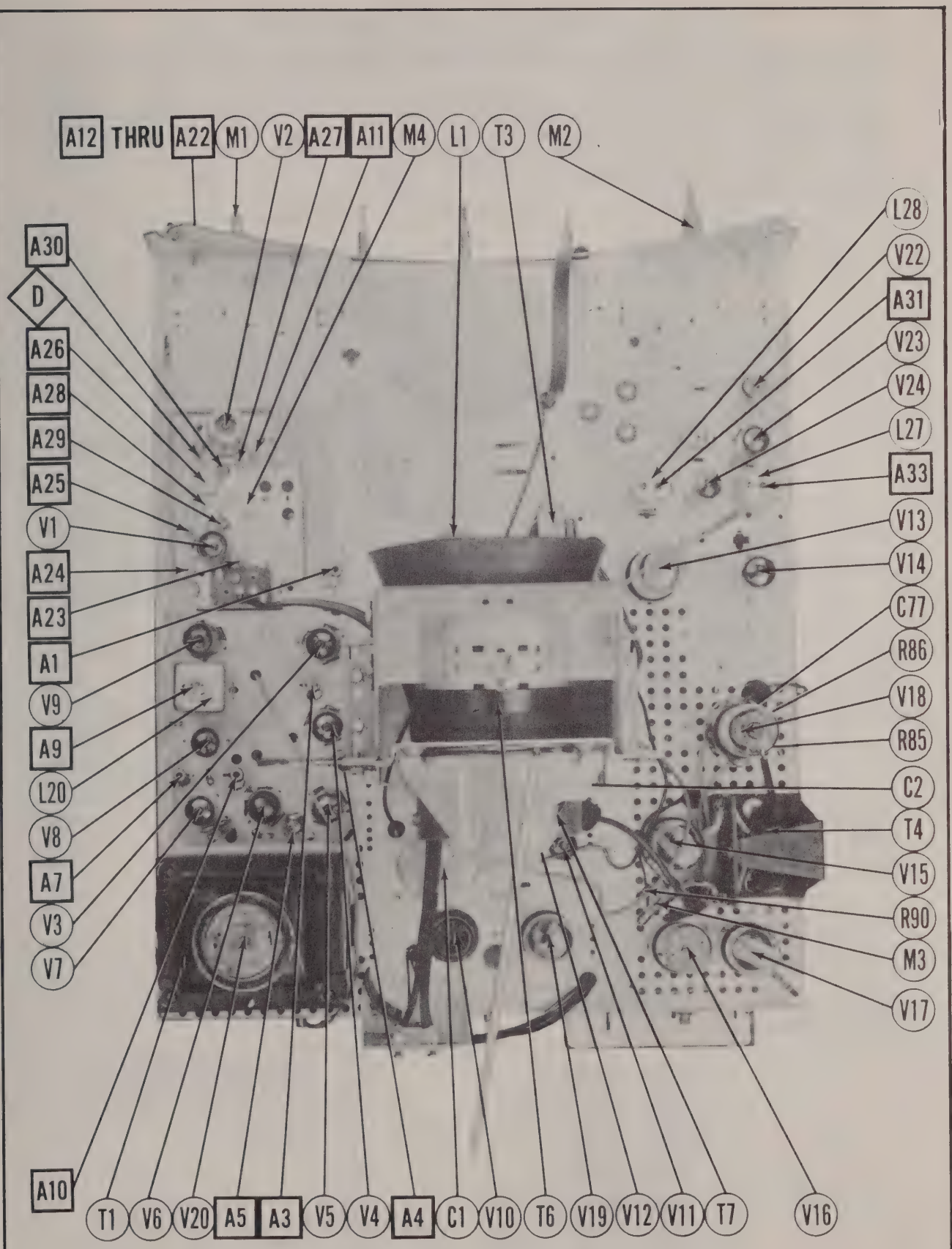




TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS TOP VIEW

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V15) from its socket.
Turn the function selector to "TV" (center-position).

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace it with a 6J6 which has pin 1 removed, this will disable the local oscillator and eliminate the possibility of erroneous indications.

Since the first video IF transformer is overcoupled, it becomes necessary to load the windings alternately when adjusting it, that is, connect a 1000Ω resistor across the primary while adjusting the secondary and across the secondary while adjusting the primary.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	24.75MC (unmod.)	Any	DC probe to point (A). Common to chassis.	A1, A2	SEE NOTE ABOVE. Adjust for maximum deflection.
2.	"	"	25.6MC	"	"	A3	Adjust for maximum deflection.
3.	"	"	23.1MC	"	"	A4	"
4.	"	"	24.5MC	"	"	A5	"
5.	"	"	21.75MC	"	"	A6	Adjust for MINIMUM deflection. Repeat step 3.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	.24MC (10MC SWP)	21.75MC 26.25MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response curve similar to fig. 1. If necessary retouch A1 thru A5 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to point A. Low side to chassis.	4.5MC (unmod.)	Any	DC probe to point (B). Common to chassis.	A7, A8	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (C). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.005MFD	High side to point A. Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C4. Adjust for maximum amplitude and symmetry as per fig. 2.
8.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A9	Reconnect capacitor C4. Adjust A9 so 4.5MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.005MFD	High side to point A. Low side to chassis.	4.5MC (unmod)	Any	DC probe thru detector fig. 4 to pin 11 (cathode) of picture tube.	A10	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect the negative lead of a 1.5 volt battery to terminal 1 of the terminal strip on the tuner, connect the positive lead to chassis.
Set the fine tuning control to the mid-position of its range.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. amp. to point (A). Low side to chassis.	A 11	Adjust to place sound marker in "notch" as shown in fig. 5.
11.	"	"	207MC (10MC SWP)	205.25MC 209.75MC	12	"	A12	Adjust to place sound marker in "notch" as shown in figure 5. If any channel strip adjustment shows insufficient range readjust A-11 and repeat all channel strip adjustments.
			201MC (10MC SWP)	199.25MC 203.75MC	11		A13	
			195MC (10MC SWP)	193.25MC 197.75MC	10		A14	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A15	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A16	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A17	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A18	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A19	
			69MC (10MC SWP)	67.25MC 71.73MC	4		A20	
			63MC (10MC SWP)	61.25MC 65.75MC	3		A21	
			57MC (10MC SWP)	55.25MC 59.75MC	2		A22	

TV ALIGNMENT INSTRUCTIONS (CONT.)

ANTENNA CIRCUIT ALIGNMENT

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Leave the 1.5 volt battery connected as during OSCILLATOR ALIGNMENT.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC SWP)	83.25MC 87.75MC	6	Vert. amp. thru detector probe (fig. 6) to pin 5 (plate) of 6CB6 (V1).	A23	Adjust for symmetrical response similar to figure 7.
13.	"	"	177MC (10MC SWP)	175.25MC 179.75MC	7	"	A24	Adjust for response curve similar to figure 8. If A24 requires large adjustment, repeat step 12.
14.	"	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"		Check all low band channels for response similar to figure 7. If necessary make compromise adjustment of A23 for best overall response.
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			
15.	"	"	183MC (10MC SWP)	181.25MC 185.75MC	8	"		Check all high band channels for response similar to figure 8. If necessary make compromise adjustment of A24 for best overall response. If A24 is changed recheck all low band channels.
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			207MC (10MC SWP)	205.25MC 209.75MC	12			
			213MC (10MC SWP)	211.25MC 215.75MC	13			

RF ALIGNMENT

Leave the bias battery connected.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC SWP)	83.25MC 87.75MC	6	Vert. amp. to point (D). Low side to chassis.	A25, A26 A27	Adjust for response curve similar to fig. 9. A25 effects the center frequency of the response curve; A26 effects the tilt of the response and A27 effects the bandwidth.
17.	"	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"		Check for response similar to figure 9. If necessary make slight compromise adjustments of A25, A26 and A27 for best overall response.
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			
18.	"	"	207MC (10MC SWP)	205.25MC 209.75MC	12	"	A28, A29, A30	Adjust for response curve similar to fig. 10. A28 effects the bandwidth; A29 effects the center frequency of the response, and A30 effects the tilt of the curve.
19.	"	"	213MC (10MC SWP)	211.25MC 215.75MC	13	"		Check for response similar to figure 10. If necessary, make compromise adjustments of A28, A29 and A30. Recheck low band channels, and repeat steps 16 thru 19, if necessary.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			

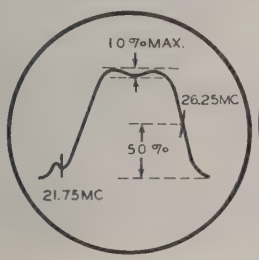


FIG. 1

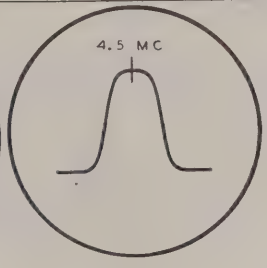


FIG. 2

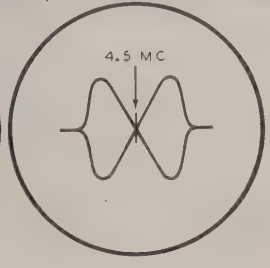


FIG. 3

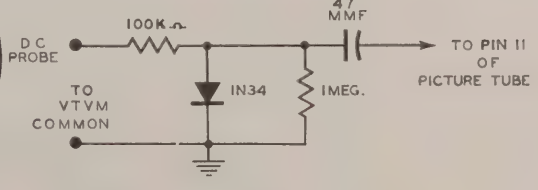


FIG. 4

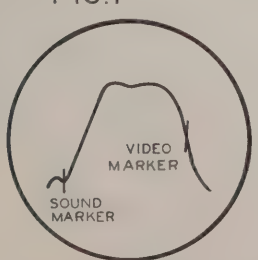


FIG. 5

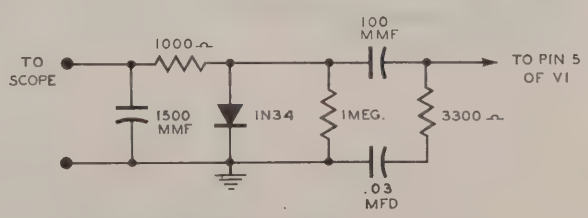


FIG. 6

FIG. 7

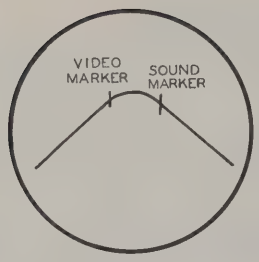


FIG.8

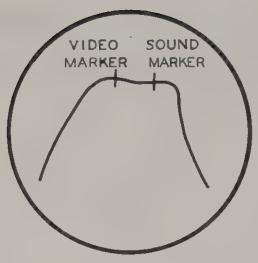


FIG.9

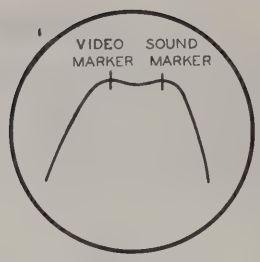
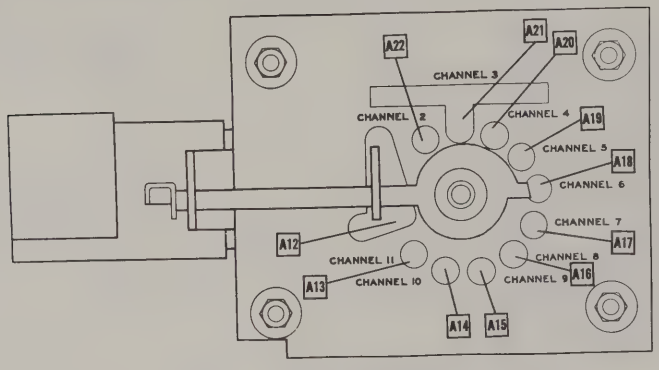


FIG.10



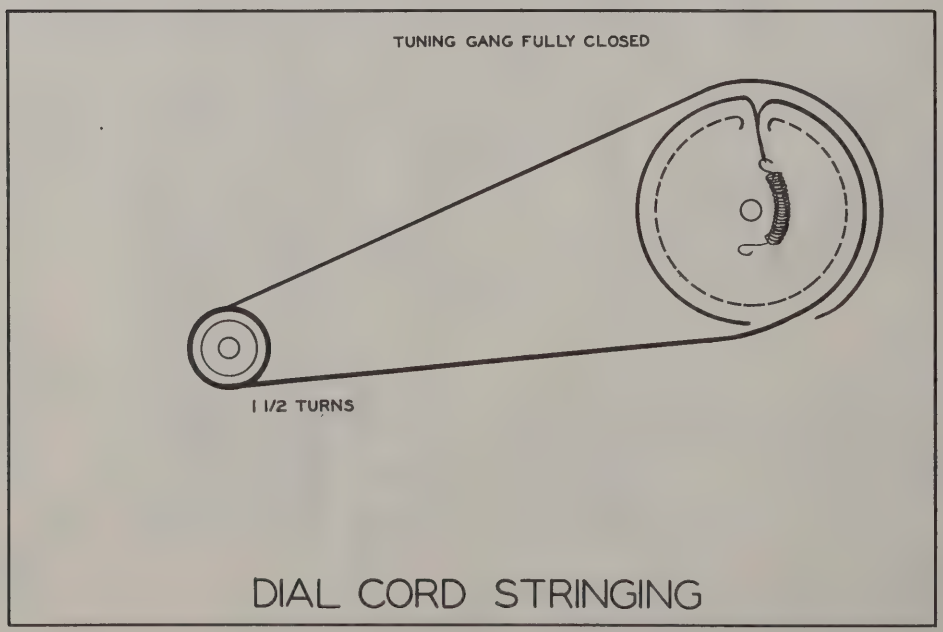
OSCILLATOR ALIGNMENT POINTS

RADIO ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn the function selector switch to AM (counter-clockwise).
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
20.	.005MFD	High side to pin 7 (grid) of 6BE6 (V23). Low side to chassis.	455KC (400 ∿ Mod.)	AM	Tuning gang fully open.	Across voice coil.	A31, A32, A33, A34	Detune A35. Adjust for maximum output.
21.	"	High side to pin 1 (grid) of 6BA6 (V22). Low side to chassis.	"	"	"	"	A35	Adjust for MINIMUM output.
22.	"	"	1620KC	"	"	"	A36	Adjust for maximum output.
23.		Loop	1400KC	"	Tune for max. output	"	A37	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.



DIAL CORD STRINGING

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	-.4VDC	0V	0V	6.3VAC	125VDC	95VDC	0V		
V 2	6J6	95VDC	75VDC	6.3VAC	0V	-1VDC	§-2.7VDC	0V		
V 3	6CB6	-.4VDC	.6VDC	0V	6.3VAC	115VDC	115VDC	0V		
V 4	6CB6	-.4VDC	.6VDC	0V	6.3VAC	120VDC	120VDC	0V		
V 5	6CB6	0V	2VDC	0V	6.3VAC	120VDC	120VDC	0V		
V 6	6AL5	0V	-2VDC	6.3VAC	0V	0V	0V	0V		
V 7	6CB6	3.3VDC	25VDC	6.3VAC	0V	200VDC	120VDC	25VDC		
V 8	6AU6	0V	0V	0V	6.3VAC	50VDC	50VDC	.6VDC		
V 9	6AL5	.5VDC	-.5VDC	6.3VAC	0V	.1VDC	0V	.1VDC		
V 10	6SQ7	0V	-.6VDC	0V	0V	0V	85VDC	6.3VAC	0V	
V 11	6AQ5	0V	13VDC	0V	6.3VAC	230VDC	245VDC	0V		
V 12	6SN7GT	0V	32VDC	7VDC	-1VDC	50VDC	0V	6.3VAC	0V	
V 13	6SN7GT	-25VDC	225VDC 105VDC	0V	32VDC	95VDC	35VDC	0V	6.3VAC	
V 14	6S4	0V	50VDC 20VDC	.6VDC	0V	6.3VAC	.6VDC	0V	0V	430VDC
V 15	6SN7GT	-1.6VDC	135VDC	-.5VDC	-38VDC	200VDC 150VDC	0V	6.3VAC	0V	
V 16	6AU5GT	-8VDC	0V	18VDC	0V	*	0V	6.3VAC	190VDC	
V 17	6W4GT	0V	0V	465VDC	0V	300VDC	0V	465VDC	465VDC	
V 18	1B3GT	* DO NOT MEASURE								
V 19	6AX5GT	460VDC	0V	200VAC	0V	200VAC	460VDC	6.3VAC	180VDC	
V 20	5U4G	0V	310VDC	0V	320VAC	0V	320VAC	0V	310VDC	
V 21	16GP4	0V	65VDC	PIN 10 440VDC	PIN 11 120VDC	PIN 12 6.3VAC				
V 22	6BA6	-.2VDC	0V	6.3VAC	0V	130VDC	65VDC	.4VDC		
V 23	6BE6	§-5.2VDC	0V	0V	6.3VAC	185VDC	55VDC	-.1VDC		
V 24	6BA6	-.2VDC	0V	6.3VAC	0V	180VDC	65VDC	.4VDC		

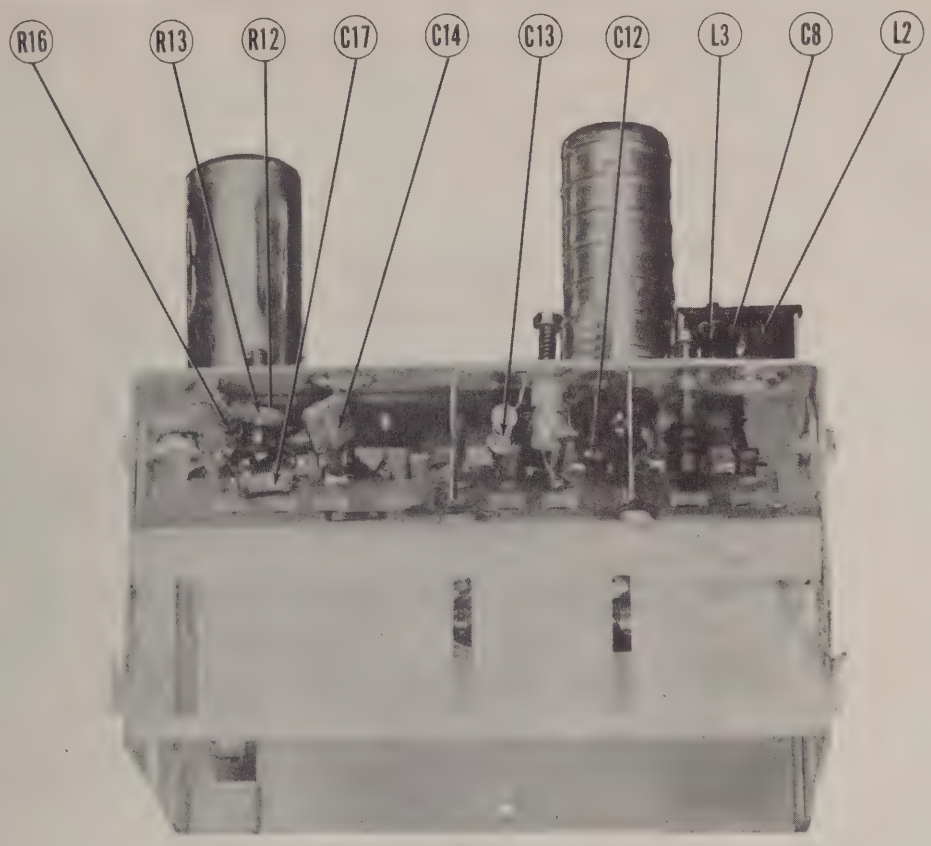
MEASUREMENTS ON V1 AND V2 TAKEN IN CHANNEL 2 POSITION
MEASUREMENTS ON V1 THRU V21 TAKEN WITH SWITCH IN TV POSITION
MEASUREMENTS ON V22 THRU V24 TAKEN WITH SWITCH IN AM POSITION
FOCUS CONTROL FULLY COUNTERCLOCKWISE
§ TAKEN WITH VACUUM TUBE VOLTMETER
* DO NOT MEASURE

RESISTANCE READINGS

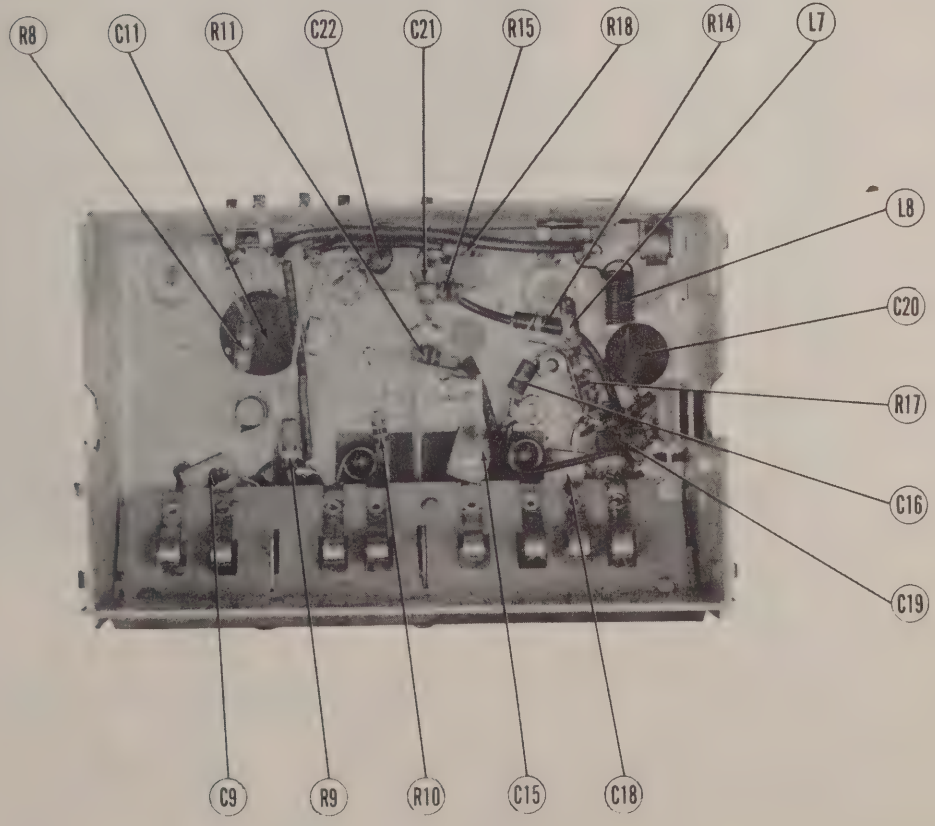
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	1Meg	0Ω	0Ω	.1Ω	‡ 2KΩ	‡ 7.8KΩ	0Ω		
V 2	6J6	‡3KΩ	‡ 12KΩ	.1Ω	0Ω	155KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	‡ 950Ω	‡ 950Ω	0Ω		
V 4	6CB6	1Meg	47Ω	0Ω	.1Ω	‡ 850Ω	‡ 850Ω	0Ω		
V 5	6CB6	.2Ω	150Ω	0Ω	.1Ω	‡ 850Ω	‡ 850Ω	0Ω		
V 6	6AL5	0Ω	3.3KΩ	.1Ω	0Ω	.3Ω	0Ω	0Ω		
V 7	6CB6	220KΩ	2.6KΩ	.1Ω	0Ω	† 8KΩ	‡ 750Ω	2.6KΩ		
V 8	6AU6	1.2Ω	0Ω	0Ω	.1Ω	‡ 22KΩ	‡ 22KΩ	150Ω		
V 9	6AL5	10KΩ	10KΩ	.1Ω	0Ω	Inf.	0Ω	Inf.		
V 10	6SQ7	0Ω	10Meg	0Ω	0Ω	0Ω	† 500KΩ	.1Ω	0Ω	
V 11	6AQ5	500KΩ	270Ω	0Ω	.1Ω	†1KΩ	†800Ω	500KΩ		
V 12	6SN7GT	0Ω	‡ 100KΩ	270KΩ	2.2Meg	‡ 40KΩ	0Ω	.1Ω	0Ω	
V 13	6SN7GT	2Meg	# 1Meg # 3.5Meg	0Ω	‡ 100KΩ	‡ 5.2KΩ	4.7KΩ	0Ω	.1Ω	
V 14	6S4	Inf.	6KΩ 1KΩ	1Meg	0Ω	.1Ω	1Meg	Inf.	Inf.	#1.6KΩ
V 15	6SN7GT	1.5Meg	†70KΩ	410KΩ	480KΩ	†60KΩ †110KΩ	0Ω	.1Ω	0Ω	
V 16	6AU5GT	470KΩ	0Ω	220Ω	Inf.	#20Ω	Inf.	.1Ω	† 15KΩ	
V 17	6W4GT	Inf.	Inf.	350KΩ	Inf.	†85Ω	Inf.	#28Ω	#28Ω	
V 18	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP #175Ω
V 19	6AX5GT	#32Ω	0Ω	100Ω	Inf.	100Ω	#32Ω	.1Ω	60KΩ	
V 20	5U4G	Inf.	14KΩ	Inf.	260Ω	Inf.	260Ω	Inf.	14KΩ	
V 21	16GP4	0Ω	50KΩ	PIN 10 #28Ω	PIN 11 ‡ 100KΩ	PIN 12 .1Ω				
V 22	6BA6	3.7Meg	0Ω	.1Ω	0Ω	‡ 10KΩ	‡ 58KΩ	68Ω		
V 23	6BE6	22KΩ	.7Ω	0Ω	.1Ω	‡ 750Ω	‡ 28KΩ	2.5Meg		
V 24	6BA6	3.7Meg	0Ω	.1Ω	0Ω	‡ 1.7KΩ	‡ 58KΩ	68Ω		

MEASUREMENTS ON V1 THRU V21 TAKEN WITH SWITCH IN TV POSITION.
MEASUREMENTS ON V22 THRU V24 TAKEN WITH SWITCH IN AM POSITION
FOCUS CONTROL FULLY COUNTER CLOCKWISE
‡ MEASURED FROM PIN 8 OF V19.
† MEASURED FROM PIN 8 OF V20.
# MEASURED FROM PIN 3 OF V17.

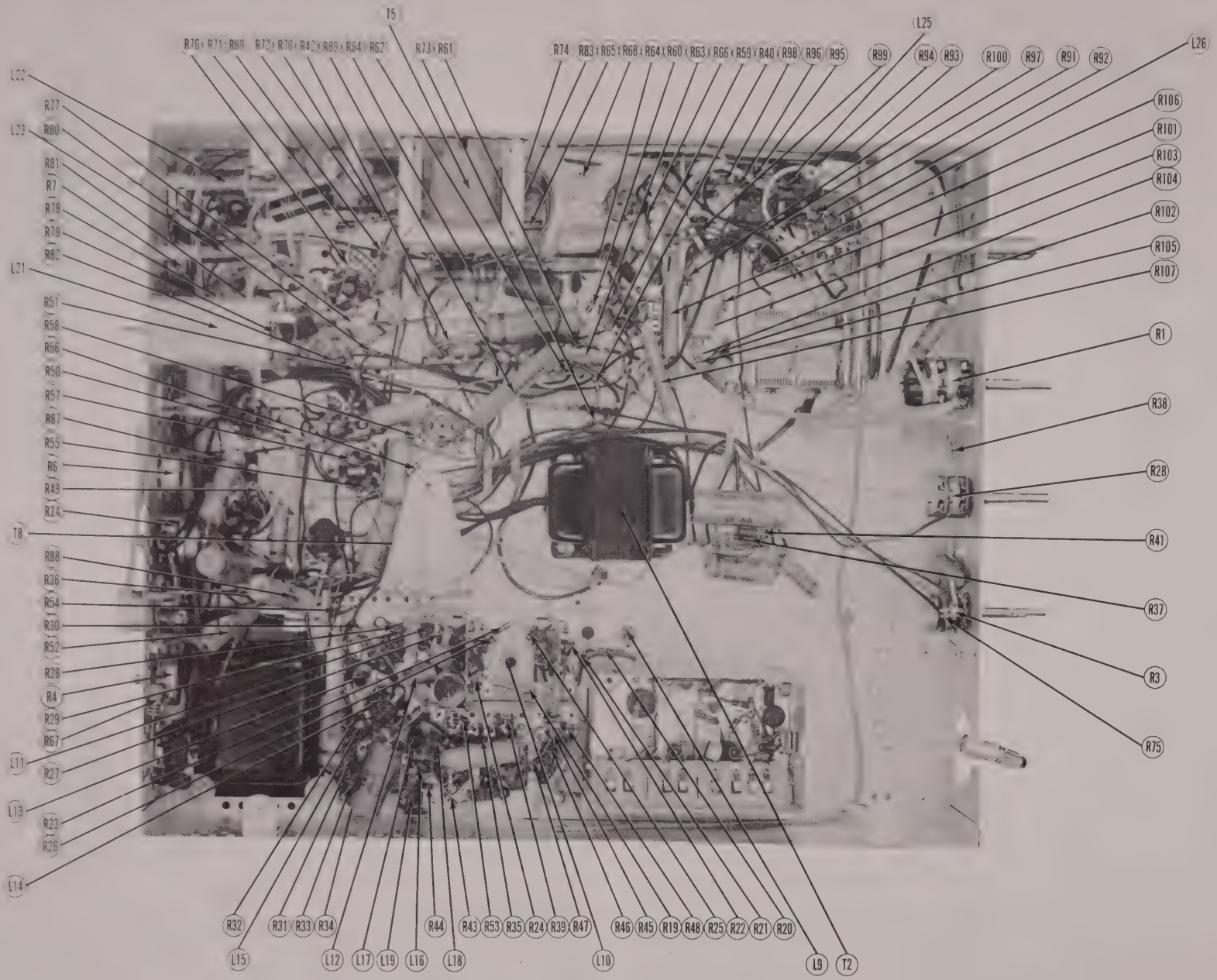
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		Hallicrafters PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	90X6CB6	6CB6	6CK	
V2	Converter	90X6J6	6J6	7BF	
V3	1st Video IF Amp.	90X6CB6	6CB6	6CK	
V4	2nd Video IF Amp.	90X6CB6	6CB6	6CK	
V5	3rd Video IF Amp.	90X6CB6	6CB6	6CK	
V6	Video Det.-AGC	90X6AL5	6AL5	6BT	
V7	Video Amplifier	90X6CB6	6CB6	6CK	
V8	Sound IF Amp.	90X6AU6	6AU6	7BK	
V9	Ratio Det.	90X6AL5	6AL5	6BT	
V10A	AF Amp.	90X6SQ7	6SQ7	8Q	
B	AF Amp.	90X6AV6	6AV6	7BT	
V11	Audio Output	90X6AQ5	6AQ5	7BZ	
V12A	Sync. Sep.-Sync. Amplifier	90X6SN7GT	6SN7GT	8BD	
B	Sync. Sep.-Sync. Amplifier	90X12AU7	12AU7	9A	
C	Sync. Amp.-Sync. Sep.	90X12AT7	12AT7	9A	
V13A	Sync. Clipper-Vert. Osc.	90X6SN7GT	6SN7GT	8BD	
B	Sync. Clipper-Vert. Osc.	90X12AU7	12AU7	9A	
C	Sync. Clipper-Vert. Osc.	90X12AT7	12AT7	9A	
V14	Vert. Output	90X6S4	6S4	9AC	
V15	Hor.AFC-Hor.Osc.	90X6SN7GT	6SN7GT	8BD	
V16A	Horiz. Output	90X6AU5	6AU5	6CK	
B	Horiz. Output	90X6AV5	6AV5	6CK	
V17	Damper	90X6W4GT	6W4GT	4CG	
V18	H.V. Rectifier	90X1B3GT	1B3GT	3C	
V19A	L.V. Rectifier	90X6AX5GT	6AX5GT	6S	
B	L.V. Rectifier	90X6X5	6X5	6S	
V20	L.V. Rectifier	90X5U4G	5U4G	5T	
V21A	Picture Tube	90X16GP4	16GP4	12D	
B	Picture Tube	90X16TP4	16TP4	12D	
V22	RF Amplifier	90X6BA6	6BA6	7BK	
V23	Converter	90X6BE6	6BE6	7CH	
V24	1st IF Amp.	90X6BA6	6BA6	7BK	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	60	450	45B173	AFH128J15B		UPT62245		TVL-2770	▲ Filter
B	40	450				BRH501		TVA-1310	■ Filter
C	75	50							▲ Vert. Output Cath.
C2A	40	450	45B174	AFH8J88F4A		UPT44430-215		TVL-4739	▲ Decoupling
B	40	250							■ Filter
C	40	250							▲ Filter
D	20	25							Output Cathode
C3	100	10	45B170	PRS12/100		BRH121A		TVA-1130	V. Amp. Cathode
C4	5	50	45B175	PRS150/4		BR550		TVA-1303	Stabilizing Cap.
C5	8	475	45A103	PRS500/8		BR850A		TVA-1802	Decoupling
C6	5	50	45B175	PRS150/4		BR550		TVA-1303	Horiz. Output Cathode
C7A	10	450	45A172	PRS450/10-10		BRD1145A		TVA-2722	V. Amp. Dec.
B	10	450							Decoupling
C8	270			SI270	D6-271		GP2K-270	19C31	RF Coupling
C9	25								Fixed Trimmer
C10	9								Fixed Trimmer
C11A	1500				DD-152		801-0015	19C20	AGC Filter
B	1500			BPD-3X0015	DD-152		801-0015	19C20	RF Amp. Fil.
C	1500				DD-152		801-0015	19C20	RF Bypass
C12	1500								RF Amp. Screen
C13	18				TCN-18		N750K-18		Fixed Trimmer
C14	16								Fixed Trimmer
C15	100								RF Coupling
C16	2.2				TCZ-2.2				Osc. Coupling
C17	3.3						N750K-3.3		Fixed Trimmer
C18	39								Osc. Feedback
C19	13								Fixed Trimmer
C20A	1500			BPD-0015	DD-2-152		812-2X0015	29C6	Conv. Fil.
B	1500								RF Bypass
C21	10								Fixed Trimmer
C22	1500			SI1500	D6-152		GP2L-0015	29C8	Conv. Plate Dec.
C23	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C24	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	1st V. IF Dec.
C25	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C26	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	2nd V. IF Dec.
C27	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	2nd V. IF Dec.
C28	68				TCN-68		N750L-68	29C15	Fixed Trimmer
C29	.5	50	46A177	P185-5		GT2P5		68P20	AGC Filter
C30	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	3rd V. IF Dec.
C31	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	3rd V. IF Cathode
C32	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	3rd V. IF Fil.
C33	10		47B20100K5	SI10	D6-100	5W5Q1	GP1K-10	19C19	V. Diode Filter
C34	.5	25	46A117	P185-5		GT2P5		68P20	Video Coupling
C35	47		47X20SL470K	SI47NPO	TCZ-47		NPOM-47	29C14	Fixed Trimmer
C36	.1	200	46AU104J	P288-1	DF-104	PTE4P1		2TM-P1	Video Coupling
C37	.01	600	46AY103J	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Picture Grid
C38	2.2		47A160-4		TCZ-2.2				S. IF Coupling
C39	47		47X20SL470K	SI47NPO	TCZ-47		NPOM-47	29C14	Fixed Trimmer
C40A	4000		47A218	BPD-2X004	DD-2-502	1D5D4	822-2X004	36C2	S. IF Dec.
B	4000					1D5D4			S. IF Cathode
C41	330		47B20331K5	SI330	D6-331	5W5T3	GP2K-330	19C14	Diode Load Cap.
C42	1000		47B20A102M5	SI1000	D6-102	1W5D1	GP2L-001	19C1	De-emphasis
C43	.01	600	46AY103J	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Audio Coupling
C44	.01	600	46AY103J	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Audio Coupling
C45A	250		*49A017	SI250		5W5T25	GP2K-250	19C13	AF Amp. Plate
B	10000			BPD-01	PC-80 *	PTE6S1	821-01	36C1	Audio Coupling
C	250			SI250		5W5T25	GP2K-250	19C13	Output Grid

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C48	.01	600	46AY303J	P688-01	DD-103	FTE5S1	821-01	6TM-S1	Output Plate
C47	220	500	47X30B221K	SI330	D6-331	5W5T25	GP2K-220	19C13	Sync. Coupling
C48	.05	600	46AY5033	P688-05	DF-503	PTE6S5		6TM-S5	Sync. Coupling
C49	68		47B20B68K5	SI68	D6-680	5W5QT	GP1K-68	19C25	Sync. Sep. Cath.
C50	.00	600	46AY5033	P688-05	DF-503	PTE6S5		6TM-S5	Sync. Coupling
C51A	2000		143A015	P688-002		PTE6D3	GP2M-002	6TM-D2	Integrator Net
B	5000			P688-005	PC-100 †	PTE6D5	811-005	6TM-D5	Integrator Net
C	5000			P688-005		PTE6D5	811-005	6TM-D5	Integrator Net
C52	.5	200	46AT5043	P688-5		GTE5P5		2TM-P5	Sync. Clipper Cath.
C53	4700	500	47X35B472K	1467-005	D6-472	1D5D5	GP2M-0047	1FM-S5	Vert. Osc. Grid †
C54	5000		47A168	BPD-005	DD-503	1D5D5	811-005	29C1	Vert. Osc. Grid
C55	1000		47B30A102M5	SI1000	D6-102	1W5D1	GP2L-001	19C1	Vert. Osc. Plate
C56	.05	600	46AY5033	P688-05		PTE6S5		6TM-S5	Vert. Discharge
C57	.1	600	46AX1043	P688-1	DF-104	PTE6P1		6TM-P1	Vert. Sweep Coupling
C58	.05	600	46AY5033	P688-05	DF-503	PTE6S5		6TM-S5	Fixed Trimmer
C59	.01	600	46AY1033	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Vert. Sweep Coupling
C60	130	500	47X30B131K	SI130	D6-131	5W5T15	GP2K-120	19C29	Hor. Sync. Coupling
C61	330	500	47X30B331K	SI330	D6-331	5R5T3	GP2K-330	19C14	Voltage Divider
C62	82	500	47X30B820K	SI82	D6-820	5R5T1	GP1K-82	MS-31	Hor. Sync. Coupling
C63	82	500	47X30B820K	SI82	D6-820	5R5T1	GP1K-82	MS-31	Horiz. Feedback
C64	.5	200	46AT5043	P288-5		GTE5P5		2TM-P5	AFC Filter
C65	.02	600	46AY3033	P688-02	DF-303	PTE6S3		6TM-S3	AFC Filter
C66	.05	600	46AY5033	P688-05	DF-503	PTE6S5		6TM-S5	AFC Filter
C67	.05	600	46AY5033	P688-05	DF-503	PTE6S5		6TM-S5	Hor. AFC Filter
C68	330	500	47X30B331K	1469-00035	D6-331	5R5T3	GP2K-330	MS-33	Hor. Osc. Grid
C69	.35	400	46BW3034	P484-01		PTK6S1	821-01	6TM-S1	Fixed Trimmer
C70	820	500	47X21821K	1469-00075		1W5T8		MS-38	Horiz. Discharge
C71	4700	500	47X35B472K	1467-005	D6-472	1D5D5	GP2M-0047	1FM-S5	Horiz. Sweep Coupling
C72	.05	600	47AY5033	P688-05	DF-503	PTE6S5		6TM-S5	Horiz. Output Screen
C73	.033	600	46AY3033	P688-033		PTK6S3		6TM-S3	Damper Filter
C74	.1	600	46AX1043	P688-1		PTE6P1		6TM-P1	Damper Filter
C75	.03	600	46AY3033	P688-03		PTE6S3		6TM-S3	Horiz. Sweep Coupling
C76	1	600	46AX1047	P688-1	DF-104	PTE6P1		6TM-P1	Horiz. Sweep Coupling
C77	500	20000	47A223	HV20C	TV3-502				H. V. Filter
C78	.01	600	46BR103J6	P688-01	D6-103	PTK6S1	821-01	6TM-S1	Line Filter
C79	.01	600	46BR10356	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Line Filter
C80	270		47B20A271K5	SI270	D6-271	5W5T25	GP2K-270	19C31	RF Coupling
C81	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Amp. Screen
C82	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Amp. Dec.
C83	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Amp. Cath.
C84	270		47B20A271K5	SI270	D6-271	5W5T25	GP2K-270	19C31	RF Coupling
C85	47		47B20A470K5	SI47	D6-470	5W5Q5	GP1K-47	19C25	Osc. Grid Cap.
C86	.02	600	46AY3033	P688-02	DF-303	PTE6S2		6TM-S2	Osc. Anode Bypass
C87	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C88	270		47B20A271K5	SI270	D6-271	5W5T25	GP2K-270	19C31	IF Coupling
C89	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	IF Decoupling
C90	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	IF Screen
C91	5000		47A168	BPD-005	DD-502	1D5D5	811-005	29C1	IF Cathode ‡
C92	.05	200	46AU503J	P288-05	DF-503	PTE6S5		2TM-S5	AVC Filter
C93	1	500	46AX1047	P688-1	DF-104	PTE6P1		6TM-P1	AVC Filter
C94	10		47B20A100K5	SI10	D6-100	5W5Q1	GP1K-10	19C19	Fixed Trimmer
C95A	100		143A016	SI100	●PC-50	5W5T1	GP1K-100	19C11	Diode RF Filter
B	100			SI100		5W5T1	GP1K-100	19C11	Diode RF Filter

* Items C45A, C45B, C45C, R50A and R50B are combined into one unit.
† Items C58A, C58B, C58C, R63A, R63B and R63C are combined into one unit.
‡ Models 822 uses 8600MMF in this application. Migrs. part number 47X35B682K.
• Not used in all models.
• Items C95A, C95B, and R103 are combined into one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	250Ω	1	25B898		RTV-234	SBB-614-S	Contrast control - front } See Note 1
B	Mfg.						Volume control and SW - rear }
R2A	250Ω	2	25B896		RTV-235		Focus control-wire wound-front } See Notes
B	50KΩ	1					Brightness control - rear } 3, 5, and 6
R2A	2500Ω	2	25B789	WK-2500	43S-2500	VK-132	Focus control - wire wound
	Switch		Not req.	SI	Not req.	K-10	Attach per instructions
B	50KΩ	1	25B894	Concentrikit BU-123 * BU-137 *† E-202 *†	RTV-236	B-31	Brightness control-front See Note 4 Attach per instructions in "Concentrikit". Attach per instructions in "Concentrikit"
				Concentrikit	RTV-236	SBB-664	
R3A	50KΩ	1	25B894	BU-123 *			Horiz. hold control -front } See Note 2
B	1Meg	1		BU-137 *			Vert. hold control- rear }
C	Shaft End			E-202			Attach per instructions in "Concentrikit"
R4A	5000Ω	1	25B712	QU-114	AM-19-S	AN-10	Vert. linearity control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R4A per instructions
R5	200Ω	2	25B714	W-200	43-200	VK-123	High voltage control - See Note 7
R6A	2.5Meg	1	25B711	QU-239	AG-84-S	AN-83	Height control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R6A per instructions
R7A	50KΩ	1	25858	QU-123	AG-44-S	AN-31	Horizontal drive control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R7A per instructions

† Solder shafts together to duplicate original.
* Additional parts to be used with "Concentrikit".
Note 1. Models 822, 810A and 815 use control with part number 25B888 in this application.
Note 2. Model with part number 25B890 in this application.
Note 3. Some models use separate controls as listed in this application.
Note 4. Part of dual control of which rear section is not used.
Note 5. Models 822, 810A and 815 use control with part number 25B889 in this application.
Note 6. Models 860 and 861 use control with part number 25B895 in this application.
Note 7. Not used in all models.

RESISTORS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE STATED
R8	3900Ω	1	23X20X392K	BTS-3900	RF Amp. Grid
R9	6800Ω	1	23X20X682K		RF Amp. Screen
R10	1000Ω	20% 1	23X20X102M	BTS-1000	RF Amp. Plate Decoup
R11	1000Ω	1	23X20X102K	BTS-1000	RF Amp. Plate Decoup
R12	4700Ω	20% 1	23X20X472M	BTS-4700	Mixer Grid

RESISTORS (CONT.)

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	IDENTIFICATION CODES
R13	150KΩ 20%	1	23X20X154M		Mixer Grid
R14	33Ω	1			Parasitic Supp.
R15	10KΩ	1	23X20X103K		Mixer Plate Decoup
R16	10KΩ	1	23X20X103K		Osc. Grid
R17	1000Ω	1	23X20X102K	BTS-1000	Osc. Plate
R18	1000Ω 20%	1	23X20X102K	BTS-1000	Decoup
R19	150Ω	1	23X20X151K	BTS-150	AGC Network
R20	100Ω	1	23X20X100K	BTS-100	Decoup
R21	4700Ω	1	23X20X472K	BTS-4700	1st Video IF Transformer Shunt
R22	47Ω	1	23X20X470K		1st Video IF Amp. Cathode
R23	100Ω	1	23X20X100K	BTS-100	1st Video IF Amp. Decoup
R24	150Ω	1	23X20X151K	BTS-150	AGC Network
R25	13KΩ	1	23X20X123K		2nd Video IF Transformer Shunt
R26	47Ω	1	23X20X470K		2nd Video Amp. Cathode
R27	10KΩ	1	23X20X103K		3rd Video IF Transformer Shunt - See Note 8
R28	100Ω	1	23X20X101K	BTS-100	Decoup
R29	150Ω	1	23X20X151K	BTS-150	3rd Video IF Amp. Cathode
R30	100Ω	1	23X20X101K	BTS-100	3rd Video IF Amp. Decoup
R31	3300Ω	1	23X20X332K	BTS-3300	Video Det. Diode Load
R32	1Meg 20%	1	23X20X105M	BTS-1Meg	AGC Network
R33	220KΩ 10%	1	23X20X224M	BTS-220K	Video Amp. Grid
R34	150Ω	1	23X20X151K	BTS-150	Video Amp. Cathode
R35	5600Ω	2	23X40X562K	BTB-5600	Video Amp. Plate
R36	1500Ω	1	23X30X152K	BTA-1500	Video Amp. Plate Decoup
R37	10KΩ	1	23X20X103K	BTS-10K	Picture Tube Grid
R38	47KΩ	1	23X20X473K	BTS-47K	Picture Tube Grid - See Note 9
R39	100KΩ 20%	1	23X20X104M	BTS-100K	Picture Tube Cathode
R40	6800Ω	1	23X20X682K	BTS-6800	Voltage Divider
R41	680Ω 20%	1	23X30X681M	BTA-680	Voltage Divider
R42	4700Ω	1	23X20X472K	BTS-4700	Isolation
R43	150Ω	1	23X20X151K	BTS-150	Sound IF Amp. Cathode
R44	22KΩ 20%	1	23X20X223M	BTS-22K	Sound IF Amp. Decoup
R45	10KΩ	1	23X20X103K	BTS-10K	Ratio Det. Diode Load
R46	10KΩ	1	23X20X103K	BTS-10K	Ratio Det. Diode Load
R47	270Ω	1	23X20X271K	BTS-270	Balancing
R48	33KΩ	1	23X20X333K	BTS-33K	De-emphasis
R49	10Meg	1	23X30X106K	BTS-10Meg	AF Amp. Grid
R50A	500KΩ	1	49A017 *		AF Amp. Plate
B	500KΩ	1			Output Grid
R51	270Ω	1	23X30X271K	BTA-270	Output Cathode
R52	15KΩ	10	24A922	1 3/4A-15K	Isolation
R53	10KΩ	1	23X20X103K	BTS-10K	Voltage Divider
R54	220KΩ 20%	1	23X20X224M	BTS-220K	Sync. Sep. Grid
R55	2.2Meg 20%	1	23X20X225M	BTS-2.2Meg	Sync. Sep. Grid
R56	39KΩ	1	23X20X393K	BTS-39K	Sync. Sep. Plate - See Note 10
R57	270KΩ 20%	1	23X20X274M	BTS-270K	Sync. Amp. Cathode
R58	820KΩ	1	23X20X824K	BTS-820K	Sync. Amp. Plate
R59	39KΩ	1	23X20X393K	BTS-39K	Sync. Clipper Grid - See Note 10
R60	4700Ω	1	23X20X472K	BTS-4700	Sync. Clipper Cathode
R61	2200Ω	1	23X20X222K	BTS-2200	Sync. Clipper Plate
R62	2200Ω	1	23X20X222K	BTS-2200	Voltage Divider
R63A	22KΩ	1	49A015 †		Integrator
B	8200Ω	1			Integrator
C	8200Ω	1			Integrator
R64	1Meg	1	23X20X105K	BTS-1Meg	Vert. Osc. Grid
R65	1Meg 20%	1	23X30X105M	BTA-1Meg	Vert. Osc. Plate
R66	1Meg 20%	1	23X20X105M	BTS-1Meg	Vert. Amp. Grid
R67	1000Ω	1	23X30X102K	BTA-1000	Vert. Amp. Cathode
R68	8200Ω	1	23X20X822K	BTS-8200	Isolation
R69	330KΩ 20%	1	23X20X334M	BTS-330K	Horiz. AFC Grid
R70	820KΩ	1	23X20X824K	BTS-820K	Horiz. AFC Grid
R71	82KΩ	1	23X20X823K	BTS-82K	Horiz. AFC Cathode - See Note 13
R72	330KΩ 20%	1	23X20X334M	BTS-330K	Horiz. AFC Cathode - See Note 12
R73	68KΩ	1	23X20X683K	BTS-68K	Horiz. AFC Plate
R74	3900Ω	1	23X20X392K	BTS-3900	Horiz. AFC Filter
R75	120KΩ	1	23X30X124K	BTA-120K	Voltage Divider
R76	150KΩ	1	23X20X154K	BTS-150K	Horiz. Osc. Grid
R77	47KΩ	1	23X30X473K	BTA-47K	Horiz. Osc. Plate
R78	12KΩ	1	23X30X123K	BTS-12K	Horiz. Osc. Plate - See Note 8
R79	8200Ω	1	23X20X822K	BTS-8200	Horiz. Osc. Transformer Shunt
R80	330KΩ 20%	1	23X20X334M	BTS-330K	Horiz. Feedback - See Note 11
R81	47Ω	1	23X20X470K		Parasitic Supp
R82	470KΩ 20%	1	23X20X474M	BTS-470K	Horiz. Output Grid
R83	220Ω	3	24A925B		Horiz. Output Cathode - Wire Wound
R84	15KΩ	2	23X40X153K	BTB-15K	Horiz. Output Screen
R85	3.3Ω	1	23X20X033K		H.V. Rectifier Filament
R86	1Meg 20%	1	23X30X105M		H.V. Filter
R87	2200Ω	1	23X30X222K	BTA-2200	Voltage Divider
R88	220Ω	25		3 1/2DA-225	Surge Limiter - Wire Wound - See Note 14
R89	750Ω	10	24A920	1 3/4A-750	Filter - Wire Wound
R90	150KΩ 20%	1	23X20X154M	BTS-150K	Fuse Shunt - See Note 14
R91	2.2Meg	1	23X20X225K		RF Amp. Grid
R92	68Ω	1	23X20X680K		RF Amp. Cathode
R93	56KΩ	1	23X20X563K		RF Amp. Screen
R94	82000Ω	1	23X20X823K		RF Amp. Plate
R95	1000Ω	1	23X20X102K	BTS-8200	RF Amp. Decoup
R96	1Meg 20%	1	23X20X105M		Converter Grid
R97	22KΩ 20%	1	23X20X223M		Osc. Grid
R98	27KΩ	1	23X30X273K		Osc. Anode
R99	2.2Meg	1	23X20X225K		IF Amp. Grid
R100	68Ω	1	23X20X680K		IF Amp. Cathode
R101	56KΩ	1	23X20X563K		IF Amp. Screen
R102	1000Ω	1	23X20X102K	BTS-1000	IF Amp. Decoup
R103	47KΩ	1	49A016 •	BTS-47K	Diode Filter
R104	470KΩ 20%	1	23X20X474M	BTS-470K	AVC Network
R105	1Meg 20%	1	23X20X105M	BTS-1Meg	AVC Network
R106	1000Ω	5	24A921	1 3/4A-1000	Focus Coil Shunt
R107	1000Ω	5	24A921	1 3/4A-1000	Voltage Divider

* Items R50A, R50B, C45A, C45B and C45C are combined into one unit.
• Items R103, C95A and C95B are combined into one unit.
† Items R63A, R63B, R63C, C58A, C58B, and C58C are combined into one unit.
Note 8. Some models use 12KΩ resistor in this application.
Note 9. Some models use 56KΩ resistor in this application.
Note 10. Some models use 47KΩ resistor in this application.
Note 11. Some models use 150KΩ resistor in this application.
Note 12. Some models use 1 watt resistor in this application.
Note 13. Some models use parallel resistor in this application to obtain desired value.
Note 14. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	780VCT	5V	6.3V	52C204 ①			
	② 2A	1.9 ADC	③ 3A	④ 9.8A				
T2	117VAC	400VCT	6.3V					
	② 2A	.08ADC	④ 1.2A					

① Part # 52C204 replaces both T1 and T2.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI	RATING DC RESISTANCE SEC	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T3	190Ω	1.4KΩ	55C115	A-8111	A-3000		Vert. Block Osc.
T4	162Ω	32Ω					
	Tap 14Ω	Tap 8.5Ω and 29Ω	55C149 ②		HV0-6		Horiz. Output
		SEC. 2					
		0Ω					
T4	170Ω	33Ω	55C152-B ③		HV0-8		Horiz. Output
	tap 15Ω	taps 8Ω and 27Ω					
		SEC. 2					
		0Ω					
T5	1.6KΩ		55B151		A-3039		Vert. Output
	Tap 4Ω						
T6A	19Ω		53C201 ①	DY-7			Horiz. Deflection Coil
B	48Ω						Vert. Deflection Coil
T6A	18Ω		53197 ②	DY-7	MDF70		Horiz. Deflection Coil
B	45Ω						Vert. Deflection Coil
T7	800Ω		51B1246				

② Used in models 810 and 822.
③ Used in models 810A, 811, 815, 820, 860 and 861.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T8	4.1KΩ	4.3Ω	280Ω	.5Ω	55B150	A-3877 ④	A-2930 ④	R0-9 ④	④ Mount on original bracket.

SPEAKER

ITEM No.	RATINGS FIELD RES.	RATINGS V. C. IMP.	REPLACEMENT DATA Hallicrafters PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	PM	4.3Ω	85104	ST-115 Mod. P8-V	8A31	
	CONE DIA.	V. C. DIA.				
SP2	7 1/4	9/16				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.084 A	85Ω	1.3 Henries	56C116	C2325 ⑤	C-2973		⑤ Drill one new mtg. hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	NOTES
L2	Ant. Trans.	.2Ω	.2Ω			
L3	Ant. Coupling	.6Ω				
L4	Ant. Coil	0Ω				
L5	RF Coil	0Ω				
L6	Osc. Coil	0Ω				
L7	RF Choke	.7Ω				Wound on 10KΩ resistor
L8	Fil. Choke	0Ω				
L9A	1st Video IF	.3Ω	.2Ω	50B471		Models 811, 818
B	1st Video IF			50B471-C		Models 810A, 815, 822, 860, 861
L10	2nd Video IF	.2Ω	.2Ω	50A475		
L11A	3rd Video IF	.2Ω	.2Ω	50A476		Models 811, 818
B	3rd Video IF			50A476-E		Models 810A, 815, 822, 860, 861
L12	Fil. Choke	0Ω		53A200		
L13	4th Video IF	.3Ω	.3Ω	50A477		
L14	Peaking	8.5Ω		51A1256		Wound on 6.8KΩ resistor
L15	Peaking	12Ω		51A160		Wound on 2.2KΩ resistor
L16	Peaking	12Ω		51A1257		Wound on 15KΩ resistor
L17A	4.5MC Trap	1.2Ω		50A474		Models 811, 818
B	4.5MC Trap			50A474-G		Models 810A, 815, 822, 860, 861
L18	Peaking	19Ω		51A1259		Wound on 2.2KΩ resistor
L19A	Sound IF	1.2Ω		50A474		Models 811, 818
B	Sound IF			50A474-G		Models 810A, 815, 822, 860, 861
L20A	Ratio Det. Trans.	4.1Ω	.7Ω	50B473		Models 811, 818
B	Ratio Det. Trans.			50B473-D		Models 810A, 815, 822, 860, 861
L21	Horiz. Osc. Trans	81Ω	50Ω	51B1242		
L22A	Horiz. Lin.	5.9Ω		51A1243		Models 811, 815, 810A, 818, 860, 861
B	Horiz. Lin.			51A1243-C		Models 822
L23A	Width Coil	23Ω		51A1261		Models 811, 818
B	Width Coil			51A1261-C		Models 810A, 815, 822, 860, 861
L24	Loop Ant.	1.4Ω		57C146		Models 811, 815, 820, 860, 861
L25	455KC Trap	62Ω		53A198		Models 811, 815, 820, 860, 861
L26	Osc. Coil	6.7Ω		51A1245		Models 811, 815, 820, 860, 861
L27	1st IF	20Ω	20Ω	50A472		Models 811, 815, 820, 860, 861
L28	2nd IF	20Ω	20Ω	50A473		Models 811, 815, 820, 860, 861

PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					Hallicrafters PART No.		
M1	Bayonet	6-8	.15	Brown	39A004		Type #47 TV Tuning
M2	Bayonet	6-8	.15	Brown	39A004		Type #47 AM Tuning

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			Hallicrafters PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M3	3AG Slo-Blo	1/4A	39A344		318.250		

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M4A	RF Tuner	1D961	Models 811, 818
B	RF Tuner	1D961-X4	Models 810A, 815, 860, 861, 822
M5A	Switch	60C391	Function (AM-TV-Phono) Models 811, 818, 860, 861
B	Switch	60B390	Function (Phono-TV) Models 810A, 815, 822
M6	Crystal	19A1246	1N-60 (AM Det.) Models 811, 818, 860, 861
M7	AM Tuning Capacitor	48C241	(25-466, 40-190MMF) Models 811, 818, 860, 861
M8A	Ion Trap	21A101-B	Models 810A, 815, 822, 860, 861
B	Ion Trap	21A101	Models 811, 818
B2 B2	Trimmer	44A391	Horiz. Lock (7-100MMF)
A35	Trimmer	44A392	(455KC Trap) Models 811, 818, 860, 861
	Safety Glass	22D288	Model 811
	Safety Glass	22D292	Models 818, 810A, 860, 861, 822
	Safety Glass	22D288-C	Model 815
	Knob	15D293	Channel Selector-Models 811, 818, 810A, 815, 860
	Knob	15D294	Channel Selector-Model 861
	Knob	15D293-C	Channel Selector-Model 822
	Knob	15A299	Fine Tuning-Models 811, 818, 810A, 815, 860, 822
	Knob	15A300	Fine Tuning - Model 861
	Knob	15B234	Volume-Models 811, 818, 860
	Knob	15C297	Volume-Models 810A, 815
	Knob	15A243	Volume-Model 861
	Knob	15C297-C	Volume-Model 822
	Knob	15B269	Contrast-Models 811, 818, 860
	Knob	15D265	Contrast-Models 810A, 815
	Knob	15A276	Contrast-Model 861
	Knob	15C295	Function Switch-Models 818, 860
	Knob	15A284	Function Switch-Models 810A, 815, 822
	Knob	15C296	Function Switch-Model 861
	Knob	15C271	AM Tuning-Models 811, 818
	Knob	15B271	AM Tuning-Model 860
	Knob	15A279	AM Tuning-Model 861

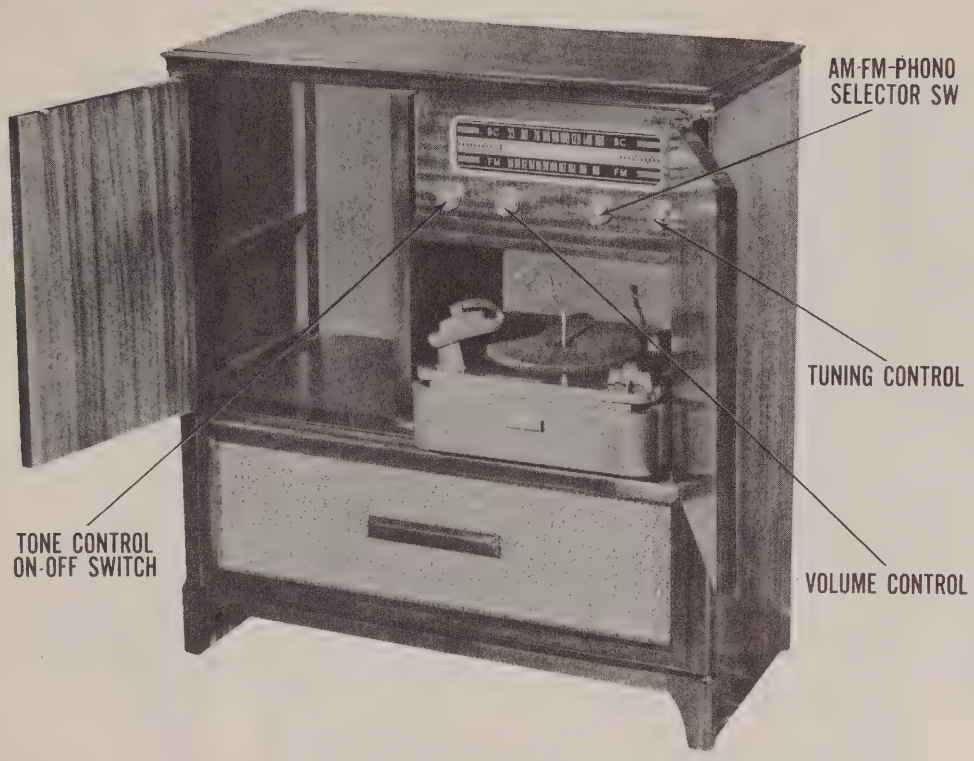
DISASSEMBLY INSTRUCTIONS - MODEL 818

1. Remove nine push-on type control knobs.
2. Remove six wood screws holding rear cover in place. Remove rear cover.
3. Disconnect antenna leads.
4. Disconnect speaker.
5. Remove five 1/4 x 20 bolts securing chassis to cabinet. Remove chassis.
6. Remove four 11/32" hex nuts from speaker. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE THE CHASSIS AS OUTLINED ABOVE.

PHILCO
MODELS 51-1731, 51-1732

PHILCO
MODELS 51-1731, 51-1732

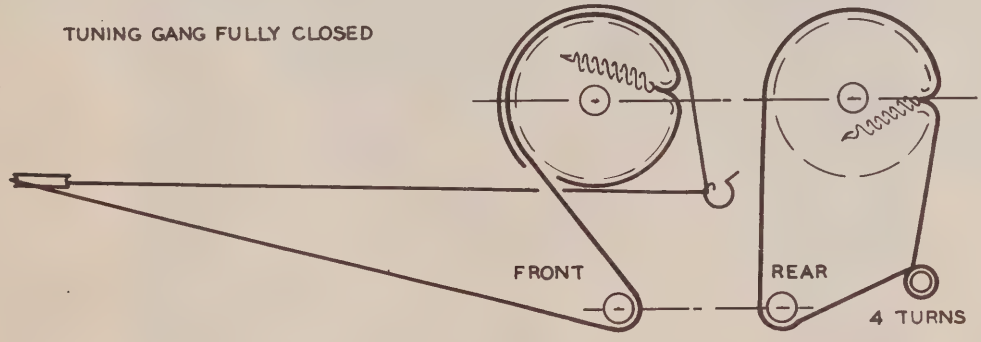


PHILCO
MODELS 51-1731, 51-1732

PHILCO MODEL 51-1732

TRADE NAME	Philco Models 51-1731, 51-1732
MANUFACTURER	Philco Corp., Tioga And "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated AM-FM Phono Combination Superheterodyne Receiver With Loop Antenna
TUBES (SEVEN)	Types 6AU6 FM RF Amp., 7F8 Conv.-Phono Pre-Amp., 6BA6 1st IF Amp., 6AU6 2nd IF Amp., 6V8 Ratio Det.-AM Det.-AVC-AF Amp., 6Y6GT Or 6W6GT Power Output, 5AZ4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING .8 Amp. @ 117 Volts AC, FREQ. MOD. 88-108MC
TUNING RANGE-BROADCAST	540-1630KC

RECORD CHANGER UNIT - PHILCO MODEL M-22



DIAL CORD DRIVE

HOWARD W. SAMS & CO., INC. • Indianapolis 1, Indiana

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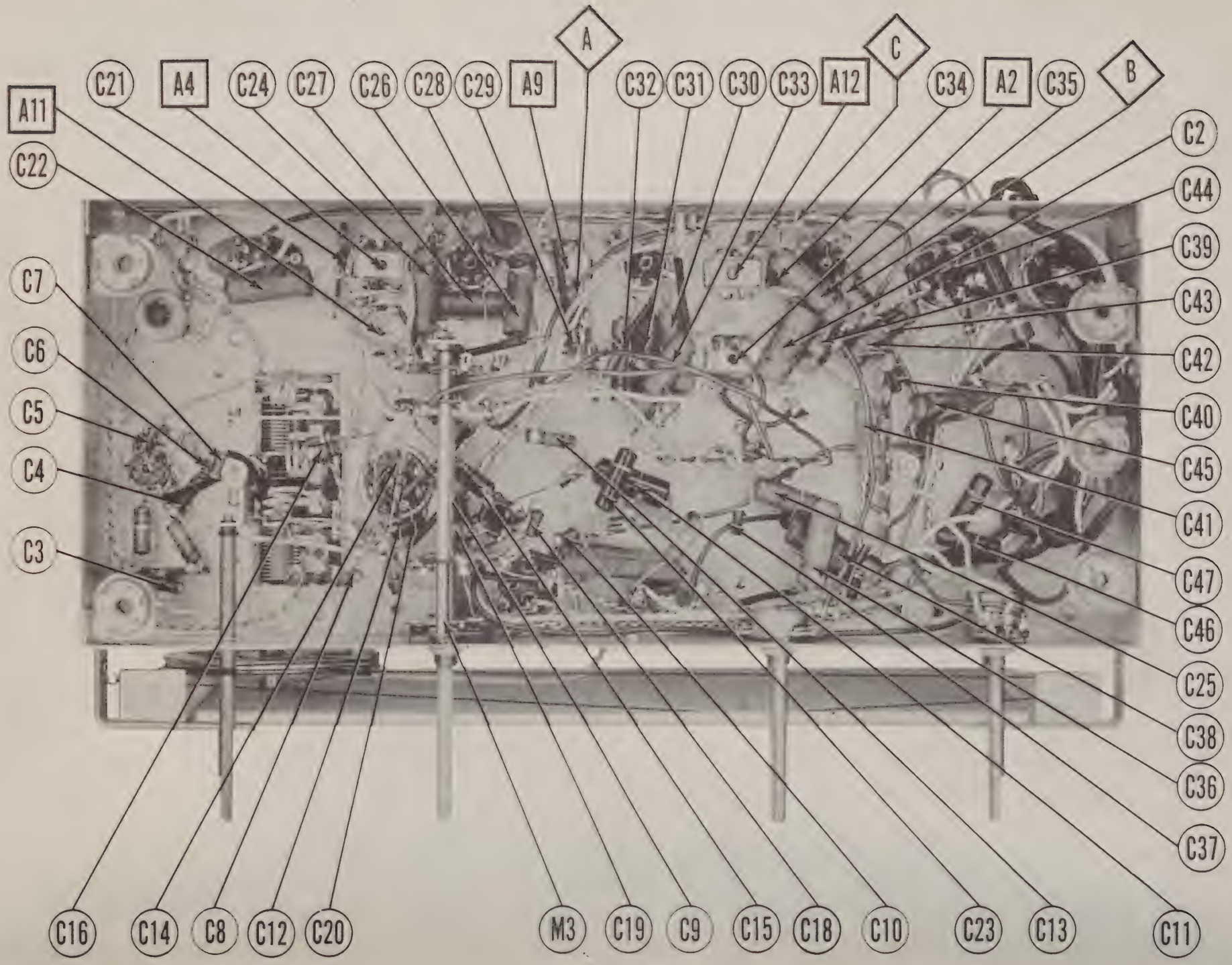
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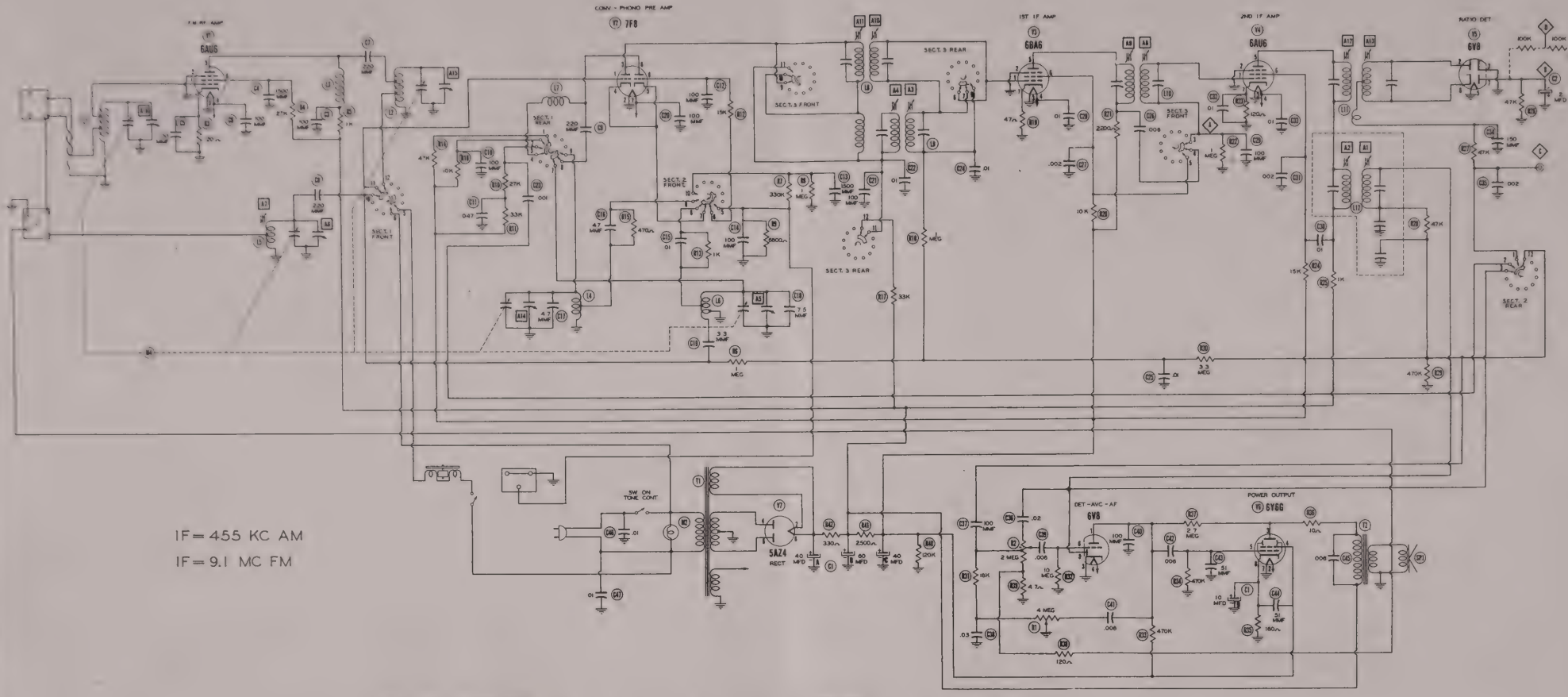

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0V	0V	0V	6.3VAC	101VDC	115VDC	1.2VDC		
V 2	7F8	0V	0V	105VDC .150VDC	12.7VDC 6.3VDC	12.7VDC 1.8VDC	168VDC 170VDC	6.3VAC	89.-.2VDC 96.-1.5VDC	
V 3	6BA6	0V	0V	0V	6.3VAC	125VDC 130VDC	105VDC	.7VDC		
V 4	6AU6	0V	0V	0V	6.3VAC	200VDC	105VDC	1VDC		
V 5	6V8	5.6VDC	8-.6VDC	0V	6.3VAC	0V	1-.6VDC	1-1.6VDC	-.6VDC	-.6VDC
V 6	6Y6G	0V	6.3VAC	185VDC	162VDC	0V	0V	0V	14VDC	
V 7	5AZ4	0V	265VDC	0V	295VAC	0V	335VAC	0V	268VDC	

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0Ω	0Ω	0Ω	.1Ω	81.3KΩ	127KΩ	120Ω		
V 2	7F8	9.2Ω 44.8Meg	0Ω	132KΩ	9.67KΩ 1KΩ	84.7KΩ 1.2KΩ	99.12KΩ 98.58KΩ	.1Ω	815KΩ 810KΩ	
V 3	6BA6	4.6Meg	0Ω	0Ω	.1Ω	85KΩ	132KΩ	47Ω		
V 4	6AU6	1Meg	0Ω	0Ω	.1Ω	81.3KΩ	128KΩ	120Ω		
V 5	6V8	2.47MΩ	Inf.	0Ω	.1Ω	0Ω	10Meg	47KΩ	Inf.	520KΩ
V 6	6Y6G	Inf.	.1Ω	1125Ω	12.8KΩ	670KΩ	Inf.	0Ω	1800	
V 7	5AZ4	Inf.	255Ω	Inf.	90Ω	Inf.	95Ω	Inf.	95KΩ	

§ TAKEN WITH VACUUM TUBE VOLTMETER
9 TAKEN IN FM POSITION
- TAKEN IN AM POSITION
† MEASURED FROM PIN 5 OF V1
‡ MEASURED FROM PINS 6AND 5 OF V2

THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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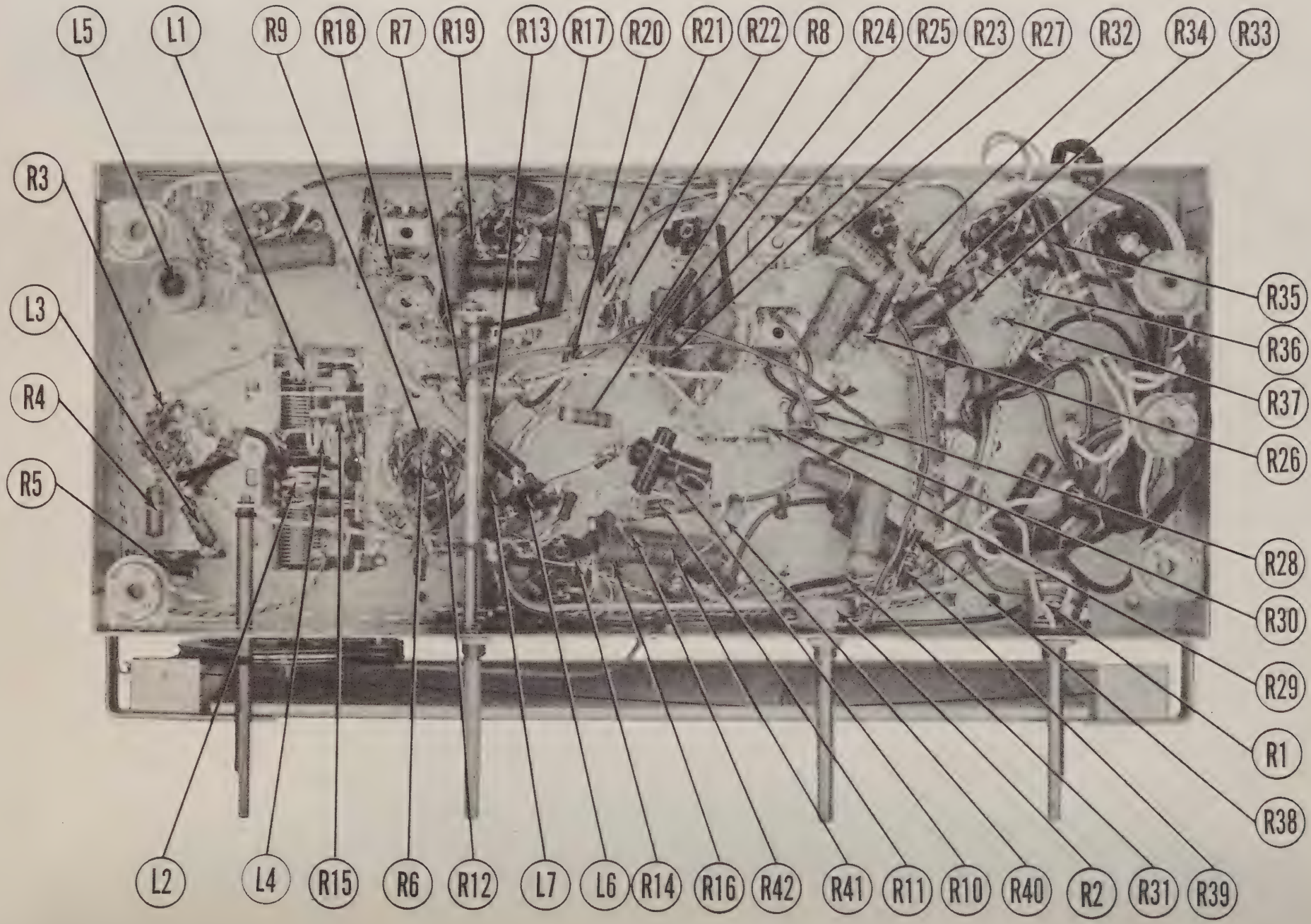
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R16
R42
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R31
R39

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning gang fully closed and set pointer to the calibration mark near the left hand end of the pointer carriage slide.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 7F8 (V2). Low side to chassis.	455KC (400 ∿ Mod.)	AM (CCW)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1600KC	"	Set pointer to right hand calibration mark on pointer carriage slide.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1500KC	"	Tune for max. output.	"	A6	"

Step 4 should not be required unless the antenna coil (L5) has been replaced.

4.		Loop	580KC	"	"	"	A7	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from Point (B) to chassis. The junction of these two resistors is alignment Point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 7F8 (V2). Low side to chassis.	9.1MC (Unmod.)	FM (Center)	Tuning range fully closed.	DC probe thru 1meg to point (A).	A8, A9, A10, A11	Adjust for max. deflection.
6.	"	"	"	"	"	DC probe to point (B). Common to chassis.	A12	"
7.	"	"	"	"	"	DC probe to point (C) Common to point (D).	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 7F8 (V2). Low side to chassis.	9.1MC (450KC SWP)	FM (Center)	Point of non-interference	Vert. amp. thru 1meg to point (A). Low side to chassis.	A8, A9, A10, A11	Adjust for maximum amplitude and symmetry as per figure 1.
6.	"	"	"	"	"	Vert. amp. to point (B). Low side to chassis.	A12, A13	Adjust A13 so 9.1MC occurs at center of crossover lines as per figure 2. Adjust A12 for max. amplitude and straightness of crossover lines. Continue with step 8.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	300Ω carbon resistor.	High side thru 300Ω to FM antenna terminal. Low side to chassis.	108MC (Unmod.)	FM	Set pointer 9 21/32 to the right of left hand edge of dial support.	DC probe thru 1 meg to point (A). Common to chassis.	A14	Adjust for maximum deflection.
9.	"	"	105MC	"	Tune for max. deflection.	"	A15, A16	Rock tuning gang while adjusting for maximum deflection.
10.	"	"	92MC	"	Set pointer 5 3/4 inches to right of left edge of dial support.	"	L4, L1 L2	Check coils, in order given with a tuning wand. If necessary expand or compress coil turns for maximum deflection. If coils are changed, repeat steps 8, 9 and 10.

FIG. 1

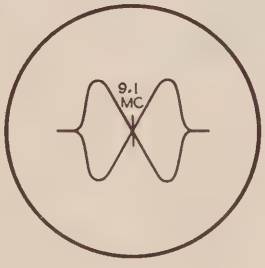


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	FM RF Amp.	6AU6	6AU6	7BK	
V2	Conv. -Phono Pre. Amplifier	7F8	7F8	8BW	
V3	1st IF Amp.	6BA6	6BA6	7BK	
V4	2nd IF Amp.	6AU6	6AU6	7BK	
V5	Ratio Det. -AM Det. AVC-AF Amp.	6V8	6V8	9AH	
V6A	Power Output	6Y6G	6Y6G	7AC	
B	Power Output	6W6GT	6W6GT	7S	
V7	Rectifier	5AZ4	5AZ4	5T	

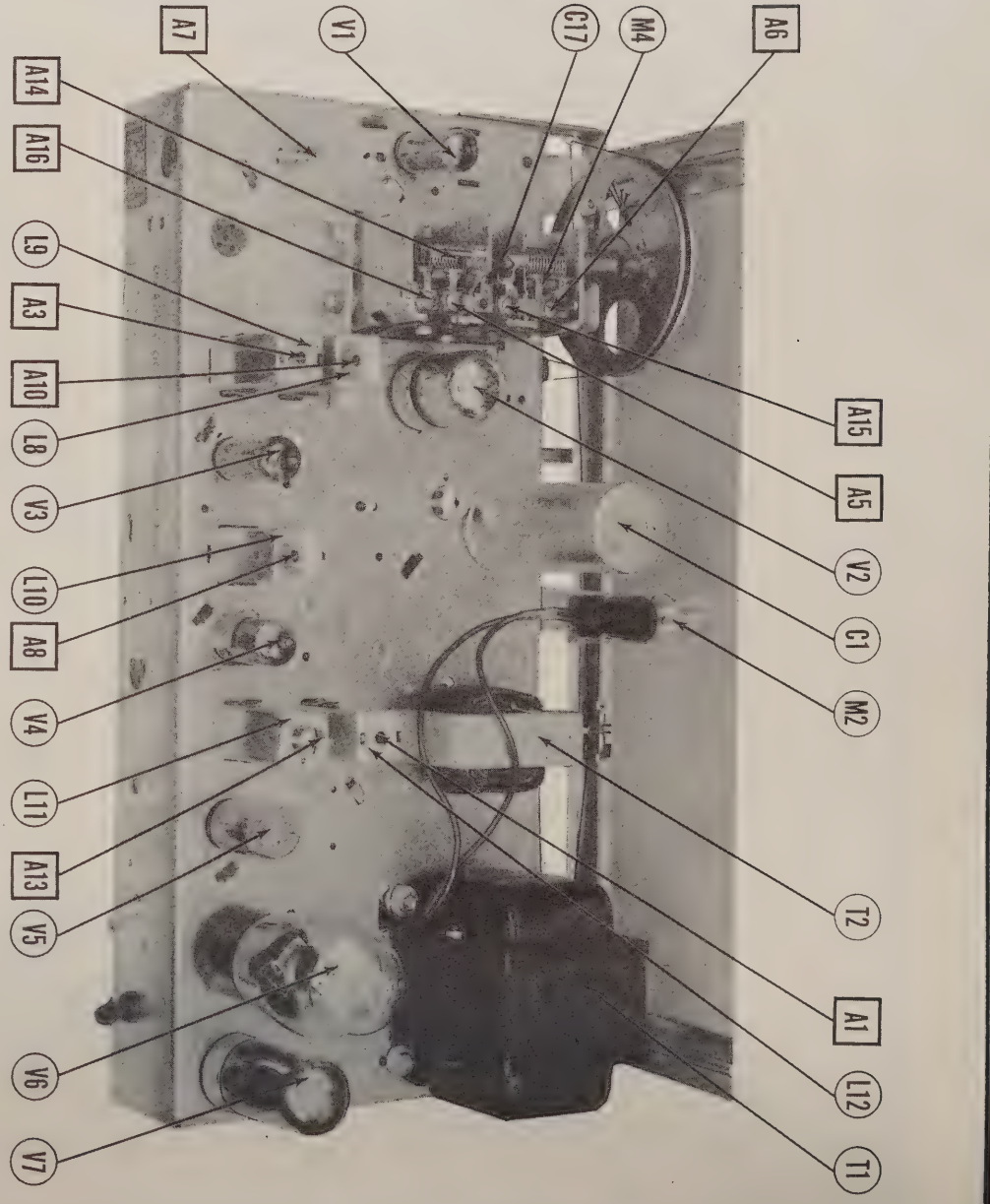
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	400	‡30-2570-64	AF812I8H2B		UPT429		TVL-4745	▬ Filter
B	60	400						TVA-1712	◙ Filter
C	40	350							▲ Filter
D	10	50							Output Cathode
C2	2	50	30-2417-7	E26E6		BBR2-50T		TVA-1301	Stabilizing Cap.
C3	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	FM RF Plate Dec.
C4	1500		62-215001001	SI1500	D6-152	1W5D15	GP2L-0015	29C8	FM RF Screen
C5	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	FM RF Cathode
C6	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	FM RF Fil.
C7	220		62-122001001	SI220	D6-221	5W5T2	GP2K-220	19C13	RF Coupling
C8	220		62-122001001	SI220	D6-221	5W5T2	GP2K-220	19C13	RF Coupling
C9	220		62-122001001	SI220	D6-221	5W5T2	GP2K-220	19C13	Osc. Feedback
C10	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	FM Osc. Plate Dec.
C11	.047	400	61-0122	P488-047	DF-503	PTE4S5		4TM-S47	Phono Pre-Amp. Dec.
C12	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	Osc. Grid Bypass
C13	1500		62-215001001	SI1500	D6-152	1W5D15	GP2L-0015	29C8	Phono Pre-Amp. Grid
C14	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	Phono Pre-Amp. Cath.
C15	.01	400	30-1226-10	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Osc. Cath. Bypass
C16	47		62-051009001	SI47	D6-470	5W5Q5	GP1K-47	19C25	Osc. Cath. Bypass
C17	4.7		30-1224-29	SI4.7NPO	TCZ-4.7		NP0K-4.7		Fixed Trimmer
C18	7.5		30-1224-65						Fixed Trimmer
C19	3.3		30-1224-59	SI3.3NPO	TCZ-3.3		NP0K-3.3		Osc. Coupling
C20	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	Conv. Fil.
C21	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	Conv. Plate Dec.
C22	.01	600	61-0120	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Conv. Plate Dec.
C23	.001	400	45-3505-55	P688-001	D6-102	PTE6D1	GP2L-001	6TM-D1	Audio Coupling
C24	.01	400	61-0120	P488-01	D6-103	PTE4S1	821-01	4TM-S1	AVC Filter
C25	.01	400	61-0120	P488-01	D6-103	PTE4S1	821-01	4TM-S1	AVC Filter
C26	.006	600	45-3500-7	P688-006	D6-562	PTE6D6	811-005	6TM-D6	1st IF Plate Dec.
C27	.002	400	61-0062	P688-002	D6-202	PTE6D2	GP2M-002	6TM-D2	1st IF Screen
C28	.01	400	61-0120	P488-01	D6-103	PTE4S1	821-01	4TM-S1	1st IF Fil.
C29	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	2nd IF Grid Filter
C30	.01	400	61-0120	P488-01	D6-103	PTE4S1	821-01	4TM-S1	2nd IF Plate Dec.
C31	.002	400	61-0062	P688-002	D6-202	PTE6D2	GP2M-002	6TM-D2	2nd IF Screen
C32	.01	400	61-0120	P488-01	D6-103	PTE4S1	821-01	4TM-S1	2nd IF Cathode
C33	.01	400	61-0120	P488-01	D6-103	PTE4S1	821-01	4TM-S1	2nd IF Fil.
C34	150	500	60-10155407	1468-00015	D6-151	5W5T15	GP2K-150	1FM-315	Diode Load Cap
C35	.002	400	61-0062	P688-002	D6-202	PTE6D2	GP2M-002	6TM-D2	De-emphasis
C36	.02	400	61-0108	P488-02	DF-203	PTE4S2		4TM-S2	Audio Coupling
C37	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	Tone Comp.
C38	.03	400	30-4517	P688-03		PTE6S3		6TM-S3	Tone Comp. *
C39	.006	400	45-3500-7	P488-006	D6-562	PTE6D6	811-005	6TM-D6	Audio Coupling
C40	100		62-110001001	SI100	D6-101	5W5T1	GP1K-100	19C11	AF Amp. Plate
C41	.006	400	45-3500-7	P488-006	D6-562	PTE6D6	811-005	6TM-D6	Tone Comp.
C42	.006	400	45-3500-7	P488-006	D6-562	PTE6D6	811-005	6TM-D6	Audio Coupling
C43	51		62-051009001	SI51	D6-500	5W5Q5	GP1K-50	19C28	Output Grid †
C44	51		62-051009001	SI51	D6-500	5W5Q5	GP1K-50	19C28	Output Screen †
C45	.006	600	45-3500-7	P688-006	D6-562	PTE6D6	811-005	6TM-D6	Output Plate
C46	.01	400	45-3505-41	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Line Plate
C47	.01	400	45-3505-41	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Line Filter

* Models 51-1731 uses .02MFD in this application. Mfgrs part # 61-0108.
† Used only in model 51-1732.
‡ Models 51-1731 uses part # 30-2570-63 in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	
R1A	4Meg	½	33-5566-12	Q11-141	AG-83-S	B-86-S	Tone control
B	Shaft		Not req.	Not req.	FS-3	Not req.	Attach to R1A per instructions
C	Switch		Not req.	76-1	SWB	Not req.	Attach to R1A per instructions
R2A	2Meg	½	33-5535-27	Q18-139X	AT-116	BT-78	Volume control - tapped ⓐ 1Meg
B	Shaft		Not req.	Not req.	FS-3	Not req.	Attach to R2A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
R3	120Ω	½	66-1128340	BTS-120	RF Amp. Cathode
R4	27KΩ	1	66-3275340	BTA-27K	RF Amp. Screen
R5	1000Ω	½	66-2108340	BTS-1000	RF Amp. Plate Decoup
R6	1Meg	½	66-5108340	BTS-1Meg	AVC Network
R7	330KΩ	½	66-4338340	BTS-330K	Phono Pre-Amp. Grid
R8	1Meg	½	66-5108340	BTS-1Meg	Phono Input Shunt
R9	6800Ω	½	66-2688340	BTS-6800	Phono Pre-Amp. Cathode
R10	27KΩ	½	66-3278340	BTS-27K	Phono Pre-Amp. Plate
R11	33KΩ	½	66-3338340	BTS-33K	Phono Pre-Amp. Plate Decoup
R12	15KΩ	½	66-3158340		Osc. Grid
R13	1000Ω	½	66-2108340	BTS-1000	AM Osc. Cathode - See Note 1
R14	47KΩ	½	66-3478340		AM Osc. Plate
R15	470Ω	½	66-1478340	BTS-470	FM Osc. Cathode - See Note 8
R16	10KΩ	½	66-3108340		FM Osc. Plate Decoup - See Note 2
R17	33KΩ	½	66-3338340		Conv. Plate Decoup - See Note 3
R18	1Meg	½	66-5108340	BTS-1Meg	AVC Network
R19	47Ω	½	66-0478340		1st IF Amp. Cathode
R20	10KΩ	½	66-3108340		1st IF Amp. Screen - See Note 4
R21	2200Ω	½	66-2228340	BTS-2200	1st IF Amp. Plate Decoup
R22	1Meg	½	66-5108340		2nd FM IF Amp. Grid
R23	120Ω	½	66-1128340	BTS-120	2nd FM IF Amp. Cathode
R24	15KΩ	½	66-3158340		2nd FM IF Amp. Screen
R25	1000Ω	½	66-2108340	BTS-1000	2nd FM IF Amp. Plate Decoup
R26	47KΩ	½	66-3478340	BTS-47K	Disc. Diode Load
R27	47KΩ	½	66-3478340	BTS-47K	De-emphasis
R28	47KΩ	½	66-3478340	BTS-47K	Diode Filter
R29	470KΩ	½	66-4478340	BTS-470K	AVC Load
R30	3.3Meg	½	66-5338340	BTS-3.3Meg	AVC Network
R31	18KΩ	½	66-3188340	BTS-18K	Tone Compensation - See Note 5
R32	10Meg	½	66-6108340	BTS-10Meg	AF Amp. Grid
R33	470KΩ	½	66-4478340	BTS-470K	AF Amp. Plate
R34	470KΩ	½	66-4478340	BTS-470K	Output Grid
R35	180Ω	2	66-1184340	BW-2-180	Output Cathode - Wire Wound - See Note 6
R36	10Ω	½	66-1108340		Parasitic Supp
R37	2.7Meg	½	66-5278340	BTS-2.7Meg	Feedback
R38	120Ω	½	66-1128340	BTS-120	Feedback Network
R39	4.7Ω	½	66-9478340	BW-½-4.7	Feedback Network - Wire Wound
R40	120KΩ	1	66-4125340	BTA-120K	Bleeder - See Note 3
R41	2500Ω	4	66-1335-93		Filter - Wire Wound - See Note 7
R42	330Ω	7	33-1335-90	1 3/4 A-350	Filter - Wire Wound

Note 1. Model 51-1731 uses 680Ω resistor in this application.
Note 2. Model 51-1731 uses 1000Ω resistor in this application.
Note 3. Model 51-1731 uses 22KΩ resistor in this application.
Note 4. Model 51-1731 uses 2200Ω resistor in this application.
Note 5. Model 51-1731 uses 27KΩ resistor in this application.
Note 6. Model 51-1731 uses 120Ω resistor in this application.
Note 7. Model 51-1731 uses 3300Ω resistor in this application.
Note 8. Some models use 330Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC ⓐ .8A	520VCT .118ADC	5V ⓐ 2A	6.3V ⓐ 3.25A	32-8462 ① 32-8459 ②	PC8405 ③		

① Used in model 51-1732.
② Used in model 51-1731.
③ Redrill mounting holes.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
T2	2.3KΩ	4Ω	185Ω	.6Ω	32-8407 ① 32-8460-1 ②	A-3825			

① Used in model 51-1732.
② Used in model 51-1731.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	V. C. IMP.	PHILCO PART No.	VIKING PART No.	QUAM PART No.	
SP1A	PM	4Ω	36-1610-6 ①	10J12	10A4	① Used in models 51-1732
B	PM	4Ω	36-1626-5 ②	8J9	8A31	② Used in model 51-1731
	CONE DIA.	V. C. DIA.				
SP2A	9 1/2	1"				
B	7 1/4	1"				

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	IRC PART No.	
L1	FM Ant. Coil	0Ω		32-4489			
L2	FM RF Coil	0Ω		32-4490			
L3	RF Choke	3Ω		32-4222-10		CLA	3.3 Microhenries
L4	FM Osc. Coil	0Ω		32-4488			
L5	AM Ant. Coil	2.3Ω		32-4413-1			Tap at .5Ω
L6A	AM Osc. Coil	9.5Ω		32-4458-3			Model 51-1732 - taps at 3Ω and 3.8Ω
B	AM Osc. Coil			32-4458-2			Model 51-1731
L7	RF Choke	3Ω		32-4222-10		CLA	3.3 Microhenries
L8	1st FM IF	1.5Ω	1.5Ω	32-4372A			
L9	1st AM IF	5Ω	12.5Ω	32-4258-3A			
L10	2nd FM IF	2.2Ω	2.2Ω	32-4372-2A			
L11	Ratio Det. Trans.	3.9Ω	.6Ω	32-4310-3A			
L12	2nd AM IF	16Ω	16Ω	32-4240-3A			

PHONO CARTRIDGE and NEEDLE

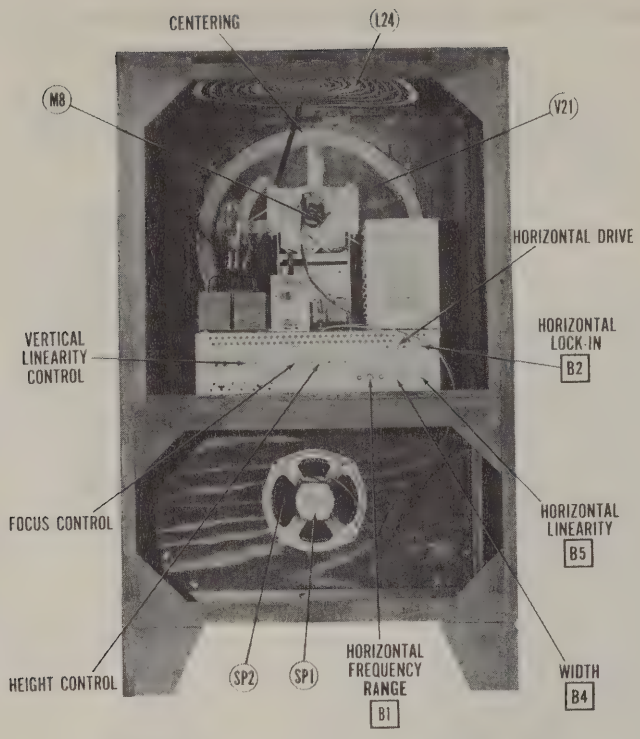
ITEM No.	REPLACEMENT DATA							REMARKS
	PHILCO PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	76-4649							

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					PHILCO PART No.		
M2	Screw	.115	1 Watt	Clear	34-2065		

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Switch	42-1942	Function Selector
M4	2 Gang Var. Cap.	31-2756-2	(36-514MMF, 17-183MMF)
A14	Trimmer	31-6511-10	FM Osc. Adj.
	Dial Scale	54-5101	Model 51-1731
	Dial Scale	54-5102	Model 51-1732
	Dial Pointer	56-5630-29	
	Diffusing Panel	54-8171-1	
	Cabinet	10822	Model 51-1731
	Cabinet	10824	Model 51-1732



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ALIGNMENT

1. Turn the set on and tune in a TV station, preferably a test pattern.
2. Turn the horizontal hold control to fully counter-clockwise.
3. Adjust the horizontal frequency slug (B1) until the horizontal blanking bar appears in the picture as a single vertical bar.
4. Turn the hold control fully clockwise and momentarily interrupt the signal by switching to another channel and back again. There should be 3 or 4 sloping bars in the picture. If more than 4 bars are present, turn the horizontal lock trimmer (B2) slightly clockwise, if less than 3 bars are present, adjust B2 slightly counter-clockwise.
5. Repeat steps 2 and 3. If the above conditions cannot be obtained, proceed with HORIZONTAL WAVEFORM ADJUSTMENT.

HORIZONTAL WAVEFORM ADJUSTMENT

Connect the vertical input lead of an oscilloscope to terminal C of L21.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal waveform slug (B3) until the broad and narrow peaks of the waveform are of equal height as shown in figure 11. If necessary adjust B1 to keep the picture synchronized. Repeat HORIZONTAL OSCILLATOR ALIGNMENT.

HORIZONTAL DRIVE, WIDTH, AND LINEARITY ADJUSTMENTS

Adjust the horizontal drive control clockwise until a vertical white line appears in the picture, and then counter clockwise just far enough to remove the white line.

Adjust the width slug (B4) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug (B5) until the picture is symmetrical from left to right.

HIGH VOLTAGE ADJUSTMENT

Connect a 50 megohm bleeder, consisting of 9-5 megohm, 1-4 megohm, and 1-1 megohm resistor in series, between the high voltage lead and chassis. Make the resistor string self supporting and connect the 1 megohm end to chassis, keep the resistors separated from each other and away from the chassis.

Connect a VTVM across the 1 megohm resistor and adjust the high voltage adjustment until the meter reads 270 volts (the meter is reading 1/50th of the high voltage, 50 x 270V equals 13, 500 volts).

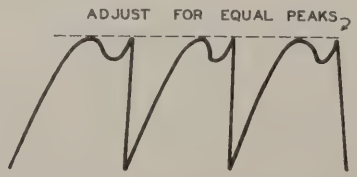


FIG. 11

PHOTOFACT* Folder

RAYTHEON MODELS C-1615A, B, 16A, B, C-1714B; 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL RC-1718B

RAYTHEON MODELS C-1615A, B, 16A, B, C-1714B; 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B

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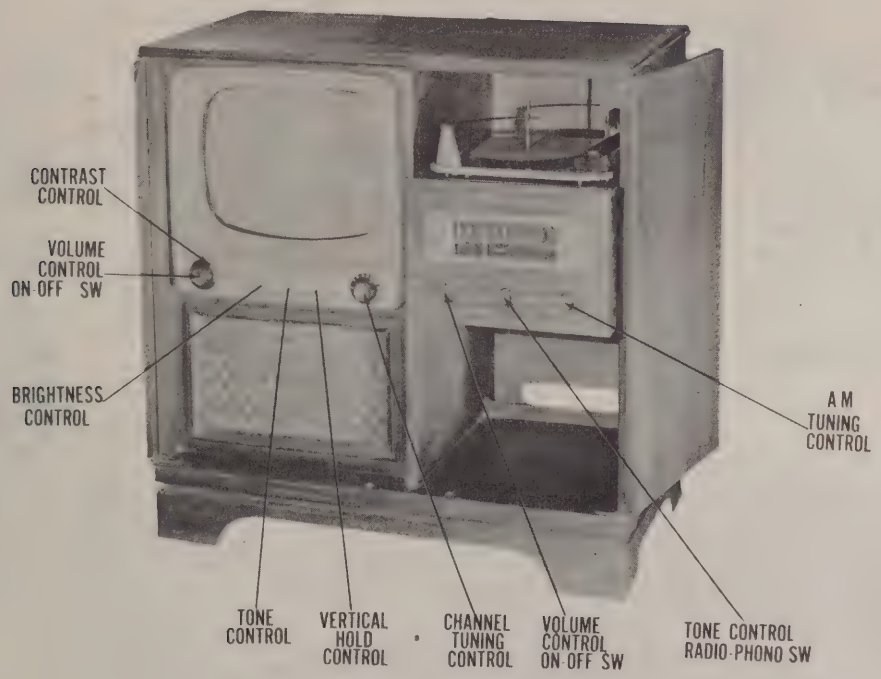
Date 2/51 Set No. 124—Folder No. 8

RAYTHEON MODELS C-1615A, B, 16A, B; C-1714B, 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B



RAYTHEON MODEL RC-1718B

TRADE NAME Raytheon	CHASSIS	MODELS
	16AY28	C-1615B, C-1616B, M-1611B, M-1612B, M-1613B, M-1614B, RC-1618B, RC-1619B
	16AY211	C-1615A, C-1616A, M-1611A, M-1612A, M-1613A, M-1614A, RC-1618A, RC-1619A
	17AY21	C-1714B, C-1715B, C-1716B, M-1711B, M-1712B, M-1713B, RC-1718B, RC-1719B
	17AY24	C-1715A, C-1716A, C-1718A, C-1719A, M-1711A, M-1712A, M-1713A, M-1714A

MANUFACTURER	Belmont Radio Corp., 5921 W. Dickens Ave., Chicago 39, Illinois
TYPE SET	TV-AM-Phono Combination Receiver (Some Models "TV Only")
TUBES	Twenty One ("TV Only" Receivers) Twenty Six (Combination Receivers)
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	TV-1.9 Amp. at 117 Volts AC, Radio .23 Amp. at 117 Volts AC
TUNING RANGE	TV- Channels 2 thru 13, AM- 540-1600KC

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Resistor and Inductor Identification 11, 18
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Schematic (TV) 2
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Voltage and Resistance Measurements 8

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT-SEE PHOTOFACT SET No. 107 FOLDER No. 13 OR RECORD CHANGER MANUAL CM-3.

HOWARD W. SAMS & CO., INC. • Indianapolis 1, Indiana

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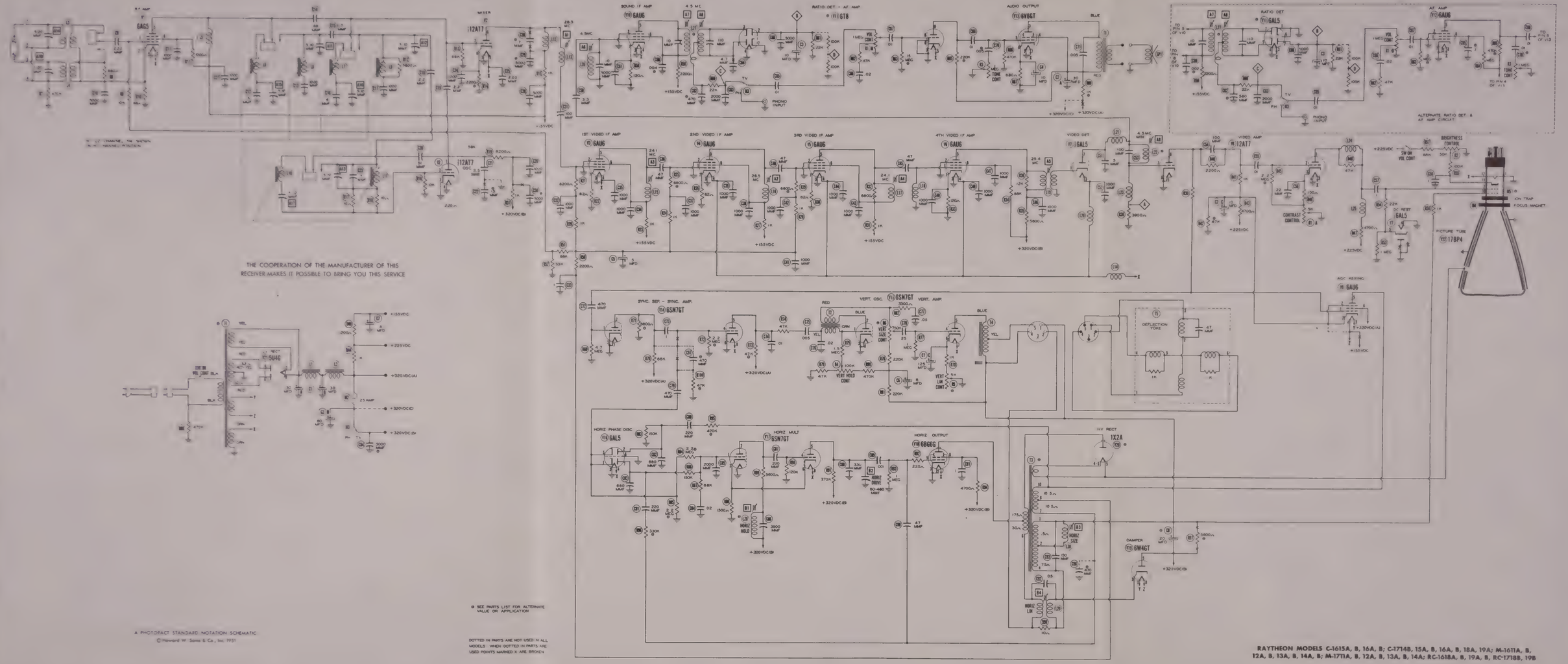
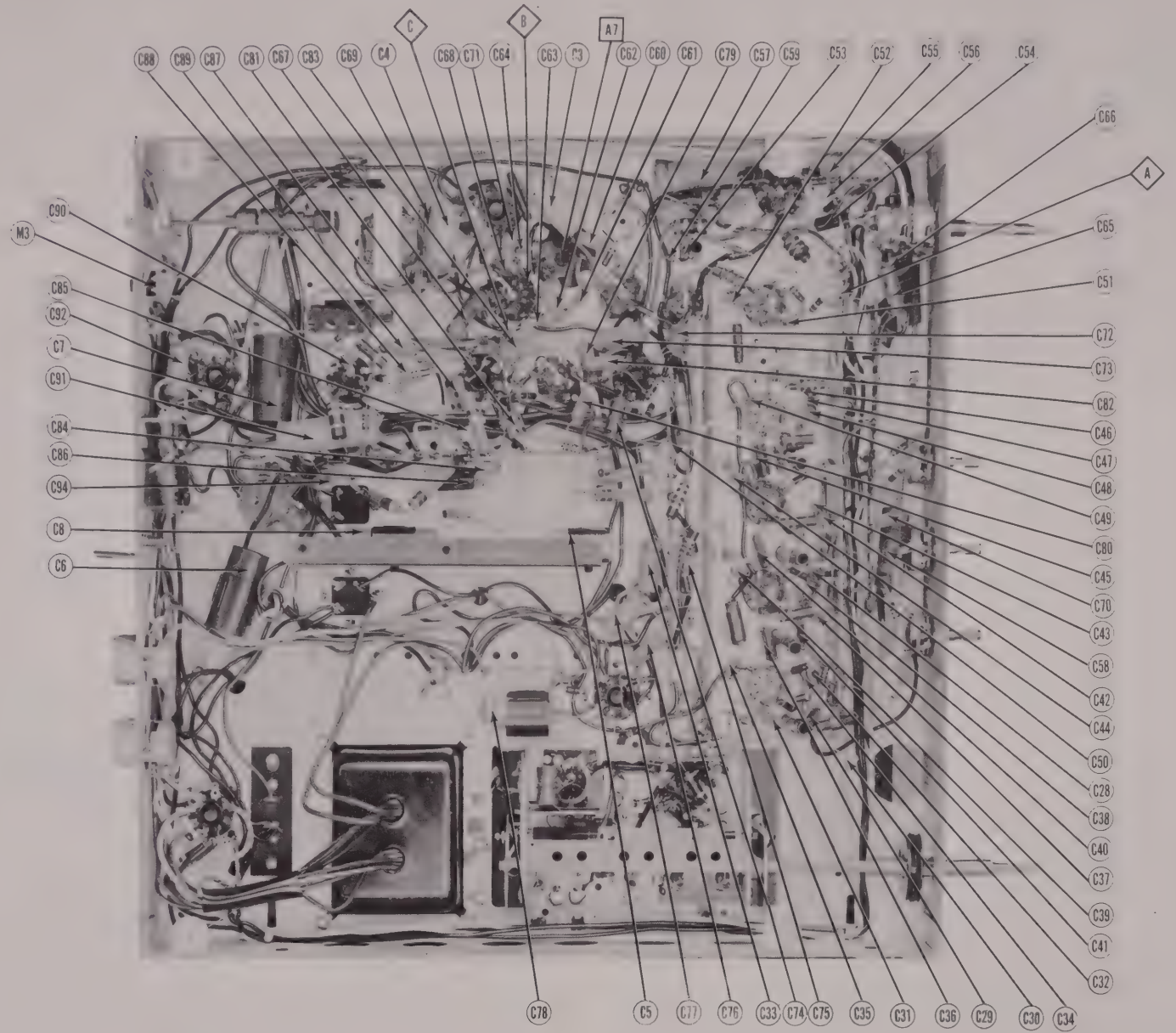
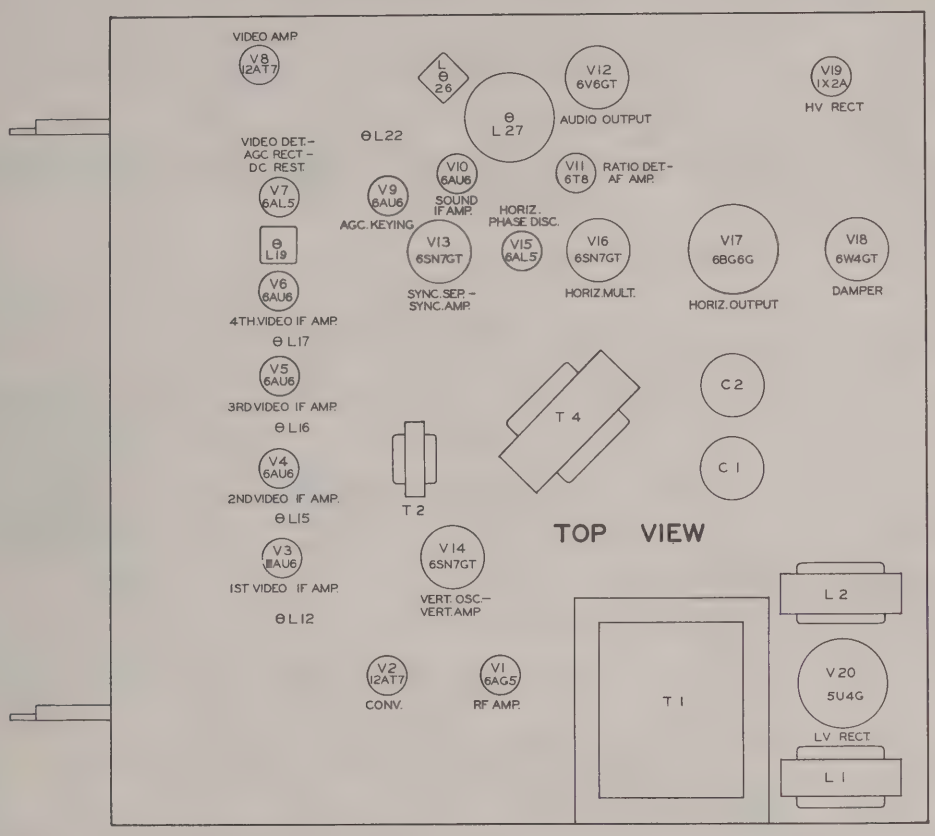

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1951
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN
RAYTHEON MODELS C-1615A, B, 16A, B; C-1714B, 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B

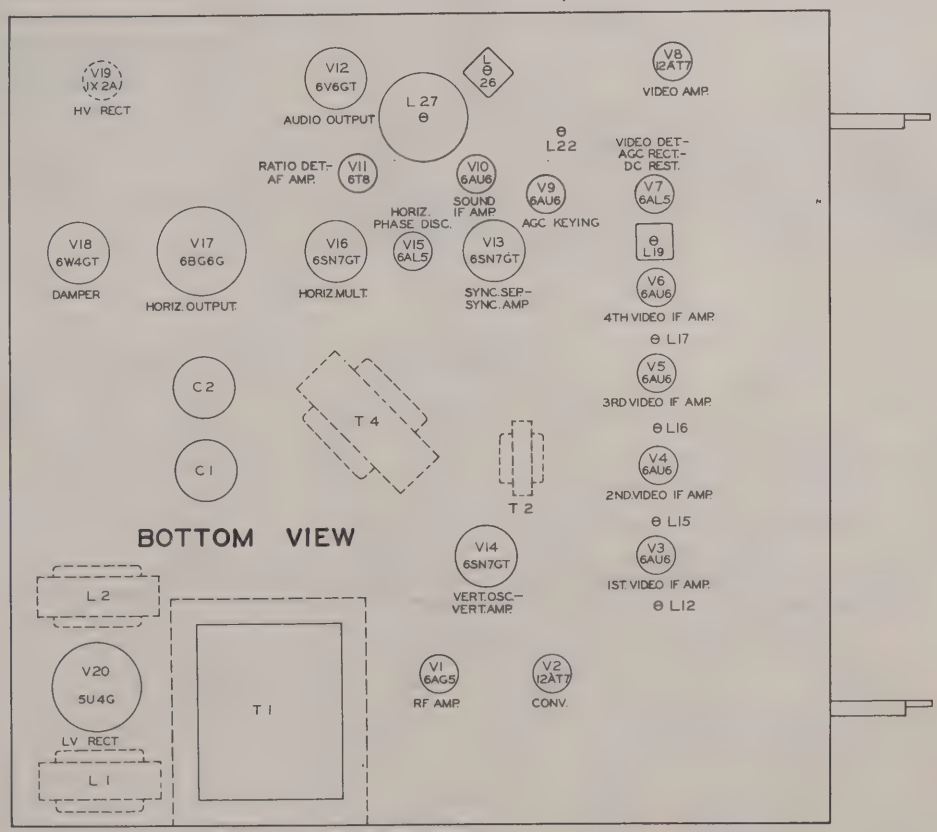
RAYTHEON MODELS C-1615A, B, 16A, B; C-1714B; 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and kept away from the chassis, do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube and replace it with a 12AT7 which has pin 1 removed; this will disable the local oscillator and eliminate the possibility of erroneous indications.
Turn the contrast control to maximum, (clockwise).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	26.5MC (Unmod.)	Any	DC probe to point (A). Common to chassis.	A1, A2	Adjust for maximum deflection. Attenuate signal generator to maintain 1 volt (above noise) reading.
2.	"	"	24.1MC	Any	"	A3, A4	"
3.	"	"	25.4MC	Any	"	A5	"

OVERALL VIDEO IF RESPONSE CHECK

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	24MC (10MC SWP)	23.75MC 26.75MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response curve similar to fig. 1. If necessary retouch A1 thru A5 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (± 1%) resistors in series from Point (B) to chassis. The junction fo these two resistors is alignment Point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.001MFD	High side to pin 1 (cathode) of 6AL5 (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A6, A7	Adjust for maximum deflection.
6.	.001MFD	"	"	Any	DC probe to point (C). Common to point (D).	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.001MFD	High side to pin 1 (cathode) of 6AL5 (V7). Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. amp. to point (B) Low side to chassis.	A6, A7	Disconnect stabilizer capacitor C3. Adjust for maximum amplitude and symmetry as per figure 2.
6.	"	"	"	"	"	Vert. amp. to point (C). Common to chassis.	A8	Reconnect capacitor C3. Adjust A8 so 4.5MC occurs at center of crossover lines as per figure 3. SLIGHTLY retouch A7 for max. amplitude and straightness of crossover lines.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (cathode) of 6AL5 (V7). Low side to chassis.	Not used	4.5MC (400 ∿ mod.)	Any	Vert. amp. to pin 2 of picture tube. Low side to chassis.	A9	Adjust for minimum 400 ∿ indication on scope.

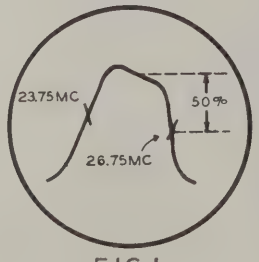


FIG.1

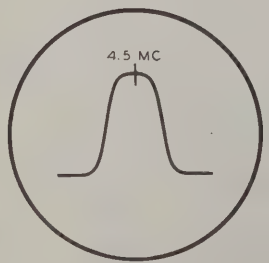


FIG. 2

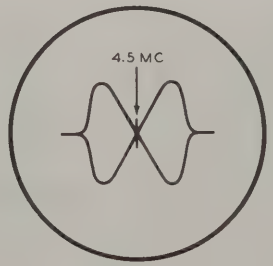


FIG. 3

TV ALIGNMENT INSTRUCTIONS (CONT.)

TUNER ALIGNMENT

Remove the dummy converter tube and replace the original 12AT7 in its socket.
Pre-set the adjustments as shown in figure 5.
Turn the tuning control until the tuning core carriage is at the top of its stroke. Pre-set the tuning cores 1.6 inches above the coil mounting strip. Turn the low band oscillator core (extreme front) an additional 4 turns out of the coil.

LOW BAND ALIGNMENT

Turn the tuning cores to the top of their stroke with the band switch in low band position (switch bar forward.)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC SWP)	83.25MC 87.75MC	6	Vert. amp. to point (A). Low side to chassis.	A10, A 11, A12	Adjust for maximum amplitude of response.
9.	"	"	"	"	"	"	A13	Adjust to place the video marker at 50% response as shown in figure 4. If necessary repeat step 8.
10.	"	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"		Adjust tuning control until the video marker on each channel is at 50% as per figure 4. If necessary readjust A 11 and A12 for compromise which gives best overall response across the low band channels.
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

HIGH BAND ALIGNMENT

Turn the tuning cores to the top of their stroke with the switch in high band position (switch bar to the rear)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	211.25MC (10MC SWP)	211.25MC 215.75MC	13	Vert. amp. to point (A). Low side to chassis.	A14, A15, A16	Adjust for maximum amplitude of response curve.
12.	"	"	"	"	13	"	A17	Adjust to place the video marker at 50% response as per figure 4.
13.	"	"	207MC (10MC SWP)	205.25MC 209.75MC	12	"		Adjust the tuning control until the video marker on each channel is at 50% as per fig. 4. If necessary readjust A15 and A16 for compromise which gives best overall response across the high band channel.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			

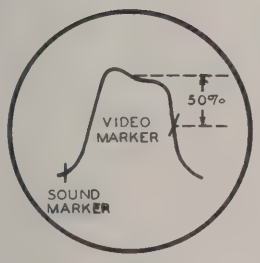


FIG.4

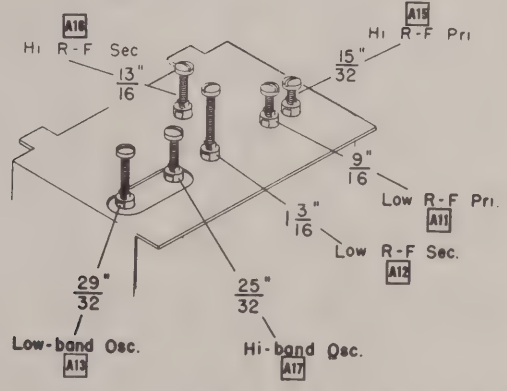


FIG.5

ALIGNING TRIMMERS

The dimensions shown are approx from the shoulder of screw head to mounting base

RADIO ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning gang fully closed and set the right hand edge of the pointer carriage even with the calibration mark near the left hand edge of the pointer carriage slide.
Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
14.	.1MFD	High side to pin 7 (grid) of 12BE6 (V22). Low side to B-.	455KC (400 ∿ Mod.)	None	Tuning gang fully open.	Across voice coil.	A18, A19, A20, A21	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
15.	"	"	1620KC	"	"	"	A22	"
16.		Loop	1400KC	"	Tune for max. output.	"	A23	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	0V	.9VDC	6.3VAC	0V	155VDC	150VDC	.9VDC		
V 2	12AT7	225VDC	§-8.4VDC	0V	0V	0V	150VDC	0V	4.2VDC	6.3VAC
V 3	6AU6	-.1VDC	0V	0V	6.3VAC	150VDC	150VDC	.9VDC		
V 4	6AU6	-.1VDC	0V	0V	6.3VAC	150VDC	150VDC	.9VDC		
V 5	6AU6	-.1VDC	0V	0V	6.3VAC	150VDC	150VDC	.9VDC		
V 6	6AU6	0V	0V	0V	6.3VAC	250VDC	145VDC	1.2VDC		
V 7	6AL5	0V	0V	5.6VAC	0V	.4VDC	0V	-.4VDC		
V 8	12AT7	185VDC	.5VDC	35VDC	0V	0V	130VDC	-.3VDC	0V	6.3VAC
V 9	6AU6	130VDC	165VDC	¶ 155VDC	¶ 155VDC	-.4VDC	320VDC	165VDC		
V 10	6AU6	0V	0V	0V	6.3VAC	135VDC	135VDC	1VDC		
V 11	6T8	-.4VDC	-.8VDC	-.4VDC	0V	6.3VAC	0V	0V	-.6VDC	95VDC
V13	6V6GT	0V	0V	280VDC	295VDC	0V	320VDC	6.3VAC	20VDC	
V14	6SN7GT	-1.1VDC	33VDC	0V	-.7VDC	80VDC	0V	0V	6.3VAC	
V15	6SN7GT	-1VDC -5VDC	37VDC	0V	0V	300VDC	18VDC 10VDC	6.3VAC	0V	
V16	6AL5	2VDC	-2VDC	0V	6.3VAC	2VDC	0V	-.2VDC		
V17	6SN7GT	0V	275VDC	11VDC	-4.2VDC	100VDC	11VDC	0V	6.3VAC	
V18	6BG6G	0V	0V	0V	-20VDC	-20VDC	-.2VDC	6.3VAC	290VDC	TOP CAP *
V19	6W4GT	0V	0V	300VDC	0V	320VDC	300VDC	¶ 155VDC	¶ 155VDC	
V20	1X2A	* DO NOT MEASURE								
V21	5U4G	0V	330VDC	0V	340VAC	♦	340VAC	♦	330VDC	
V22	17BP4	0V	.5VDC	PIN 10 300VDC	PIN 100VDC	11 0V	PIN 12 6.3VAC			

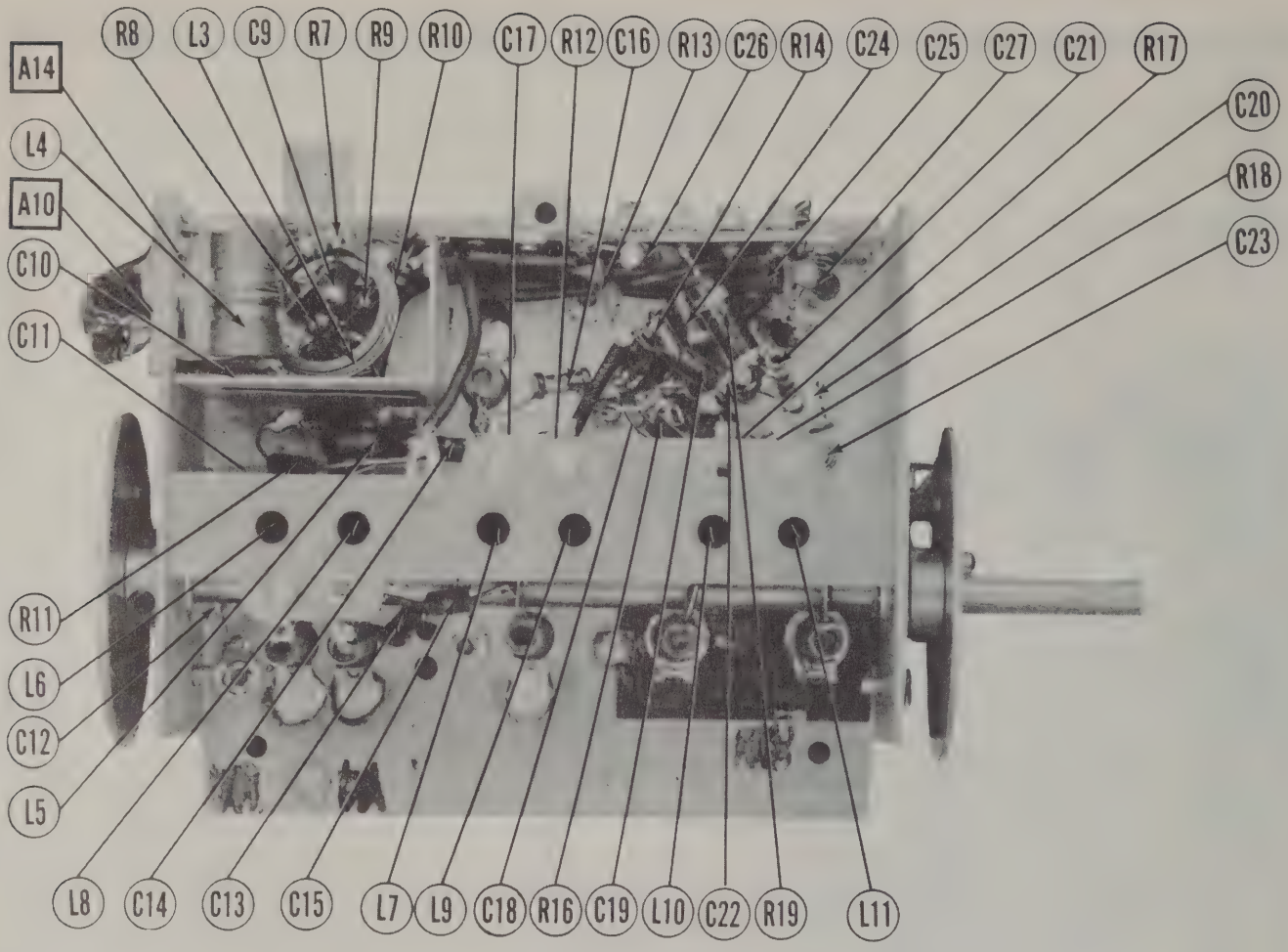
§ TAKEN WITH VACUUM TUBE VOLTMETER
¶ 6.3VAC MEASURED ACROSS FILAMENTS
♦ 117VAC ACROSS PINS 5 AND 7 OF V21
* DO NOT MEASURE

RESISTANCE READINGS

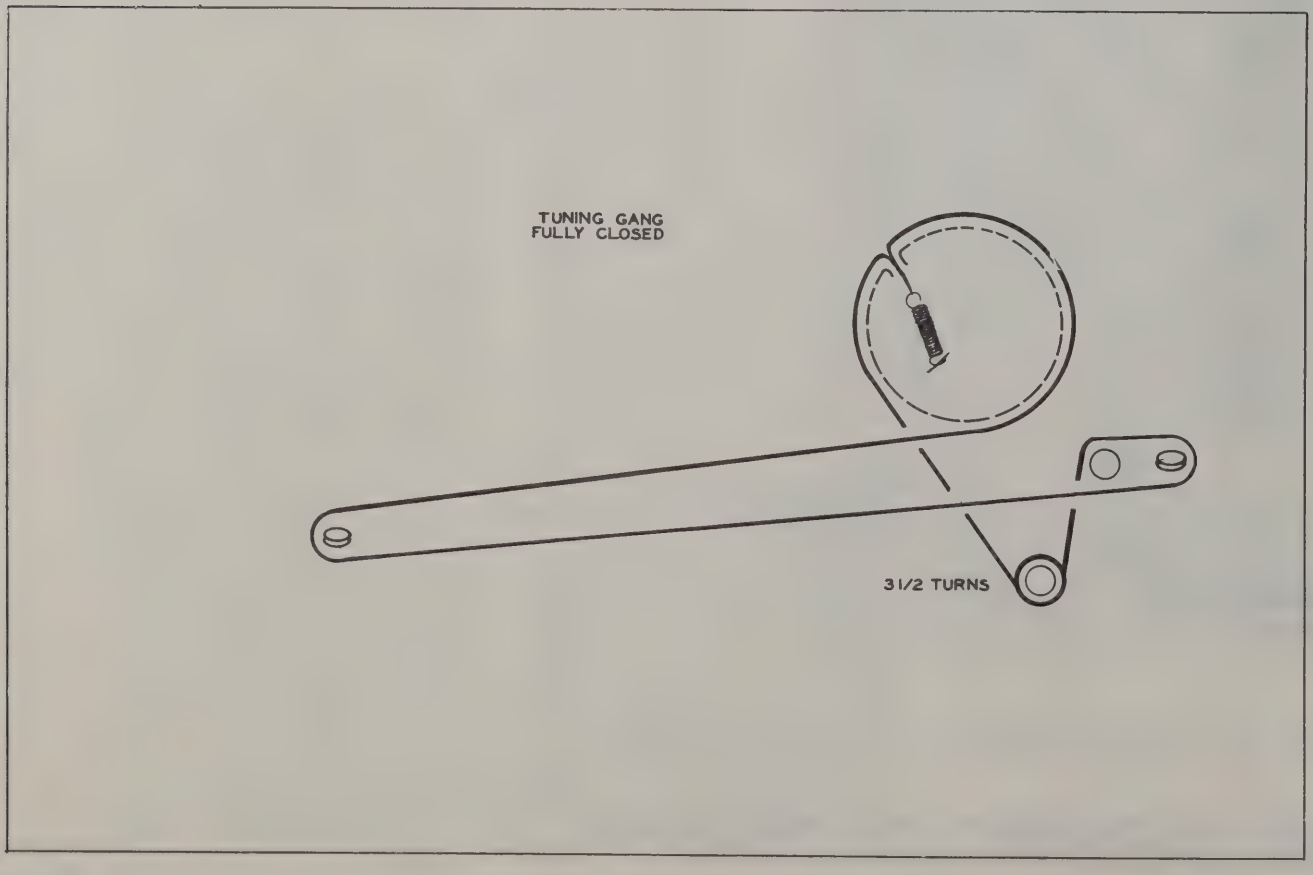
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	43KΩ	68Ω	.1Ω	0Ω	†2.3KΩ	†3.3KΩ	68Ω		
V 2	12AT7	†9.3KΩ	10KΩ	0Ω	0Ω	0Ω	†3.3KΩ	68KΩ	2.2KΩ	.1Ω
V 3	6AU6	110KΩ	0Ω	0Ω	.1Ω	†3.3KΩ	†3.3KΩ	82Ω		
V 4	6AU6	110KΩ	0Ω	0Ω	.1Ω	†3.3KΩ	†3.3KΩ	82Ω		
V 5	6AU6	110KΩ	0Ω	0Ω	.1Ω	†3.3KΩ	†3.3KΩ	82Ω		
V 6	6AU6	2.3Ω	0Ω	0Ω	.1Ω	†5.6KΩ	†68KΩ	120Ω		
V 7	6AL5	.9Ω	0Ω	1.2Ω	0Ω	1Meg	0Ω	3.9KΩ		
V 8	12AT7	†5.8KΩ	2.2Meg	5KΩ	0Ω	0Ω	†9KΩ	3.9KΩ	0Ω	.1Ω
V 9	6AU6	†20KΩ	†5.8KΩ	†2.3 KΩ	2.3KΩ	105KΩ	†70Ω	†5.8KΩ		
V 10	6AU6	3.7Ω	0Ω	0Ω	.1Ω	†4.5KΩ	†4.5KΩ	120Ω		
V 11	6T8	Inf.	22KΩ	Inf.	0Ω	.1Ω	0Ω	0Ω	15Meg	†220KΩ
V13	6V6GT	Inf.	0Ω	†1.5KΩ	†1.1KΩ	470KΩ	†70Ω	.1Ω	820Ω	
V14	6SN7GT	4.7Meg	†30KΩ	0Ω	2.2Meg	†47KΩ	0Ω	0Ω	.1Ω	
V15	6SN7GT	1.5Meg 1.6Meg	†1.2Meg	0Ω	1Meg	†6.3KΩ	6KΩ 1KΩ	.1Ω	0Ω	
V16	6AL5	2.2Meg	150KΩ	0Ω	.1Ω	2.2Meg	0Ω	4.5Meg		
V17	6SN7GT	4.4Meg	†5.8KΩ	1.5KΩ	120KΩ	†270KΩ	1.5KΩ	0Ω	.1Ω	
V18	6BG6G	Inf.	0Ω	0Ω	1Meg	1Meg	105KΩ	.1Ω	†4.8KΩ	TOP CAP †5.8KΩ
V19	6W4GT	Inf.	Inf.	†5.7KΩ	Inf.	†70Ω	†5.7KΩ	†2.3KΩ	†2.3KΩ	
V20	1X2A	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP †6KΩ
V21	5U4G	Inf.	35KΩ	Inf.	32Ω	470KΩ	32Ω	470KΩ	35KΩ	
V22	17BP4	0Ω	1Meg	PIN 10 † 6.7KΩ	PIN 140KΩ	11 100KΩ	PIN 12 .1Ω			

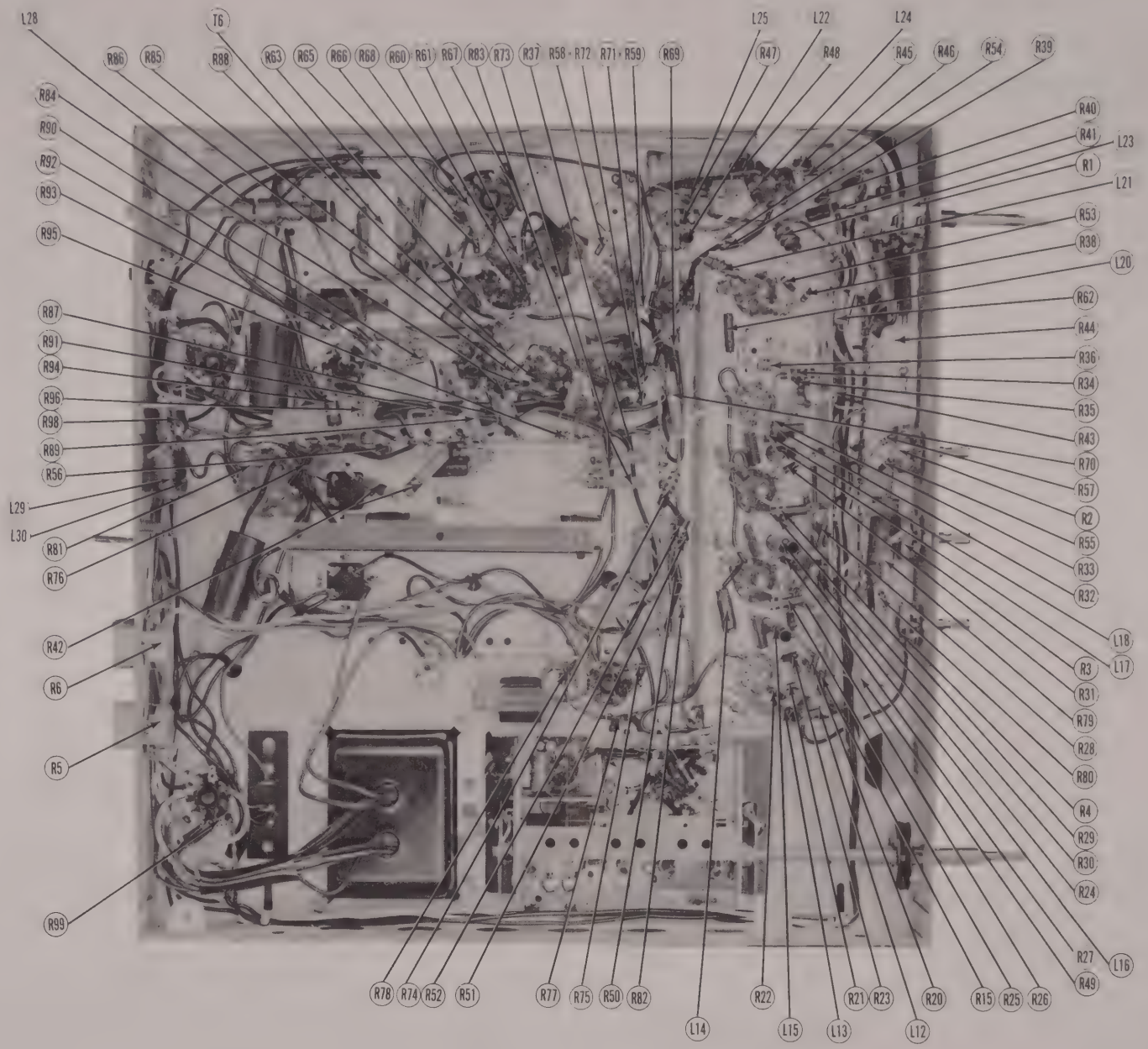
TV - PHONO SWITCH IN TV POSITION
† MEASURED FROM PIN 8 OF V21

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

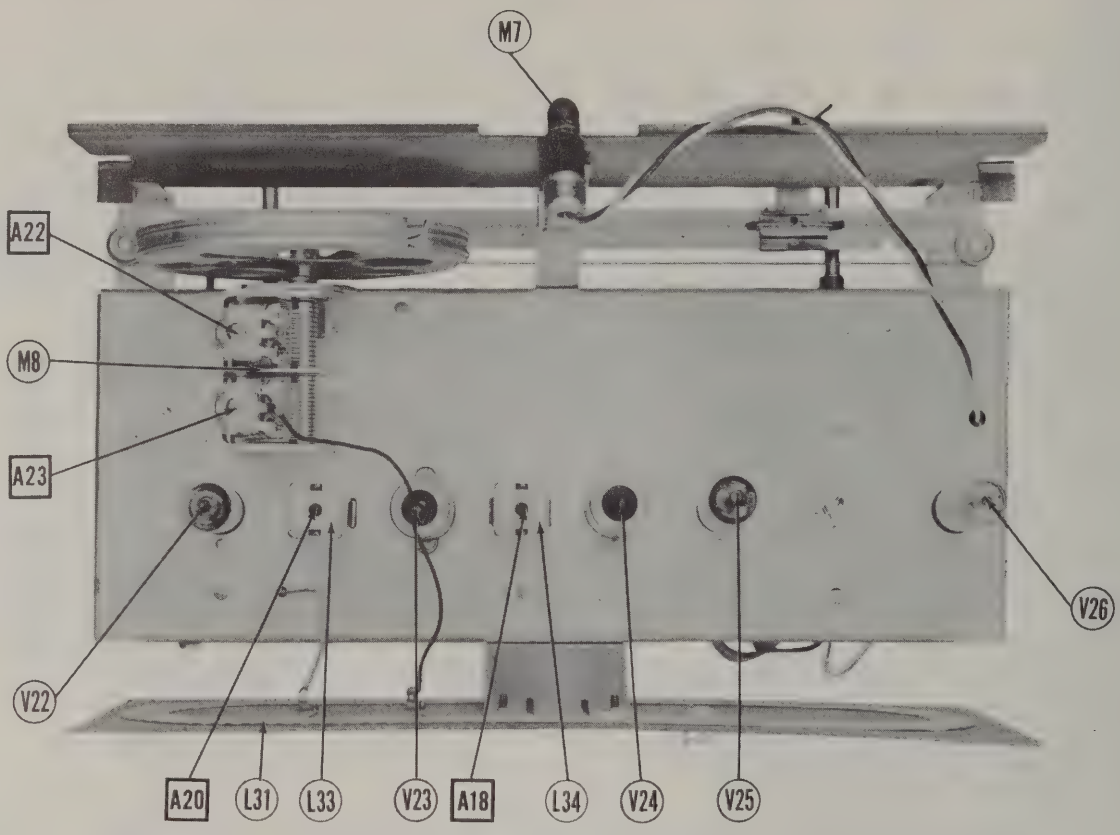


RF TUNER - BOTTOM VIEW

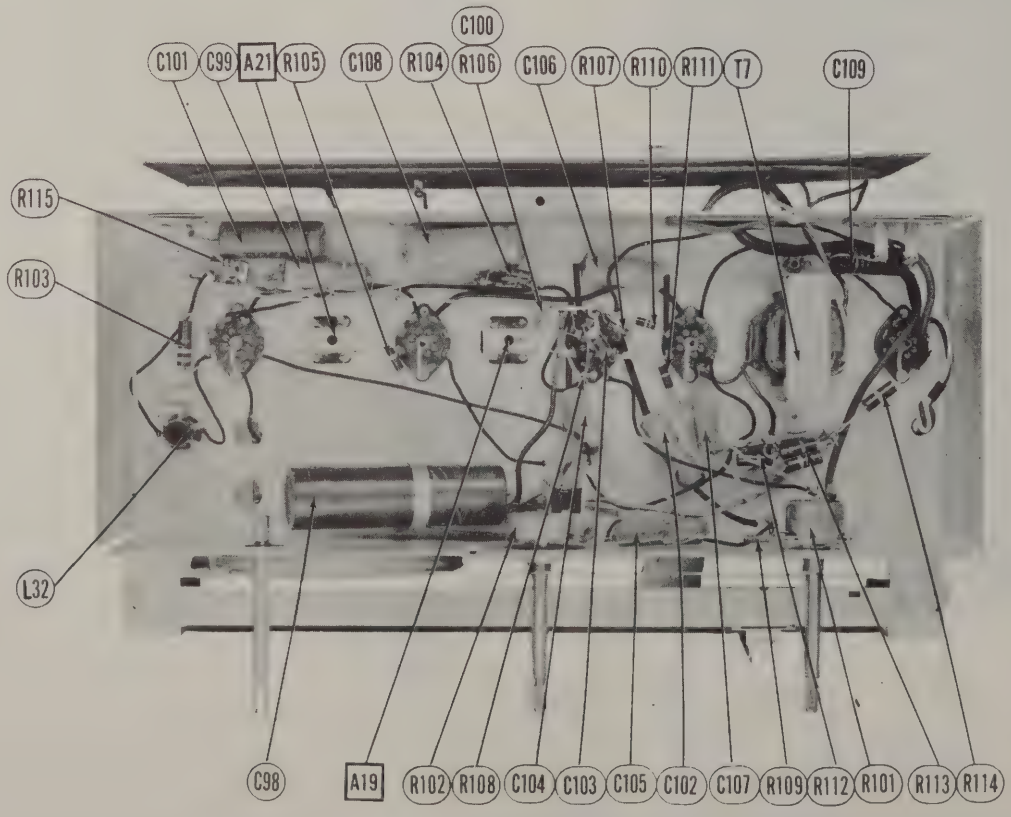




CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



RADIO CHASSIS-TOP VIEW



RADIO CHASSIS-BOTTOM VIEW

TV PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Converter	12AT7	12AT7	9A	
V3	1st Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd Video IF Amp.	6AU6	6AU6	7BK	
V5	3rd Video IF Amp.	6AU6	6AU6	7BK	
V6	4th Video IF Amp.	6AU6	6AU6	7BK	
V7	Video Det.-AGC Rect.-DC Rest.	6AL5	6AL5	6BT	
V8	Video Amp.	12AT7	12AT7	9A	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11A	Ratio Det.-AF Amp.	6T8	6T8	9E	
B	Ratio Det.	6AL5	6AL5	6BT	
V12	AF Amp.	6AU6	6AU6	7BK	
V13	Audio Output	6V6GT	6V6GT	7AC	
V14	Sync. Sep.-Sync. Amplifier	6SN7GT	6SN7GT	8BD	
V15	Vert. Osc.- Vert. Amplifier	6SN7GT	6SN7GT	8BD	
V16	Hor. Phase Discr.	6AL5	6AL5	7BT	
V17	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V18	Horiz. Output	6BG6G	6BG6G	5BT	
V19	Damper	6W4GT	6W4GT	4CG	
V20A	H.V. Rectifier	1X2A	1X2A	7CB	
B	H.V. Rectifier	1X2	1X2	7CB	
V21	L.V. Rectifier	5U4G	5U4G	5T	
V22	Picture Tube	17BP4	17BP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	450	A-8C-18487	AF66J25A		UPT409		TVL-3741	▲ Filter
B	30	450						TVA-1207	■ Filter
C	125	25							▲ Vert. Output Cath.
C2A	30	450	A-8C-17845	AFH3668J		UPT36145		TVL-3790	▲ Filter
B	60	450							■ Filter
C	10	450							▲ Decoupling
C3	10	50	A-8C-17183	PRS50/10		BR105		TVA-1304	Stabilizing Cap
C4	10	50	A-8C-19564	PRS50/10		BR105		TVA-1304	Output Cath. Bypass
C5	5	50	A-8C-19424	PRS150/4		BR550		TVA-1303	AGC Filter
C6	8	450	A-8C-13453	PRS450/8		BR845A		TVA-1704	Decoupling
C7	8	450	A-8C-13453	PRS450/8		BR845A		TVA-1704	Decoupling
C8	20	150	A-8C-19546	PRS150/20		BR2015A		TVA-1410	Decoupling *
C9	220		C-8G-16045	SI220	D6-221		GP2K-220	19C13	RF Coupling
C10	5000		A-8G-13962	BPD-005	DD-502		811-005	811-005	RF Amp. Cath.
C11	1000		C-8G-13201	SI1000	D6-102		GP2L-001	19C1	RF Amp. Screen
C12	15		C-8G-13017		TCZ-15		NPOK-15	19C5	Fixed Trimmer
C13	1000		C-8G-13201	SI1000	D6-102		GP2L-001	19C1	RF Bypass
C14	.68		A-8G-12495-1		TCZ-.68				RF Coupling
C15	1.5		A-8G-12495-8	SI1.5NPO	TCZ-1.5		NPOK-1.5		RF Coupling
C16	4		C-8G-19314						Fixed Trimmer
C17	1000		C-8G-13201	SI1000	D6-102		GP2L-001	19C1	RF Bypass
C18	2.2		A-8G-12495-4		TCZ-2.2				Osc. Coupling
C19	2.2		A-8G-12495-4		TCZ-2.2				Osc. Coupling
C20	51		C-8G-11891		TCN-51		N750L-51		Osc. Feedback
C21	2.5		C-8G-19568						Fixed Trimmer
C22	15		C-8G-13017		TCZ-15		NPOK-15	19C5	Fixed Trimmer †
C23	7		C-8G-19572				N750K-7		Fixed Trimmer
C24	1000		C-8G-13201	SI1000	D6-102		GP2L-001	19C1	Conv. Cath.
C25	220		C-8G-16045	SI220	D6-221		GP2K-220	19C13	Conv. Fil.
C26	1000		C-8G-13201	SI1000	D6-102		GP2L-001	19C1	RF Bypass
C27	1000		C-8G-13201	SI1000	D6-102		GP2L-001	19C1	RF Bypass
C28	5000		A-8G-13962	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C29	5000		A-8G-13962	BPD-005	DD-502	1D5D5	811-005	29C1	Conv. Plate Dec. §
C30	7		C-8G-11790	SI6.8NPO	TCZ-6.8		NPOK-6.8		Fixed Trimmer †
C31	100	500	C-8F3-8	1468-0001	D6-101	5W5T1	GP1K-100	1FM-31	IF Coupling
C32	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	AGC Filter
C33	.1	200	C-8D-17259	P288-1	DF-104	PTE4P1		2TM-P1	AGC Filter
C34	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	1st V. IF Dec.
C35	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	1st V. IF Fil.
C36	47	500	C-8F3-109	1468-00005	D6-470	5W5Q5	GP1K-47	1FM-45	IF Coupling
C37	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	AGC Filter
C38	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	2nd V. IF Dec.
C39	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	2nd V. IF Fil.
C40	47	500	C-8F3-109	1468-00005	D6-470	5W5Q5	GP1K-47	1FM-45	IF Coupling
C41	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	AGC Filter
C42	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	AGC Filter
C43	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	3rd V. IF Dec.
C44	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	3rd V. IF Fil.
C45	47	500	C-8F3-109	1468-00005	D6-470	5W5Q5	GP1K-47	1FM-45	
C46	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	4th V. IF Plate Dec.
C47	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	4th V. IF Screen
C48	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	4th V. IF Cath.
C49	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	4th V. IF Fil.
C50	5000		A-8G-13962	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass ♦
C51	5		C-8G-12166	SI5NPO	TCZ-4.7	5R5V5	NPOK-.5	MS-55	V. Diode Filter
C52	1000		C-8G-13201	SI1000	D6-102	1W5D1	GP2L-001	19C1	V. Det.-DC Res. Fil.
C53	100	500	C-8F1-113	1469-0001	TCZ-100	5R5T1	NPOM-100	MS-31	Fixed Trimmer
C54	100	500	C-8F1-113	1469-0001	TCZ-100	5R5T1	NPOM-100	MS-31	Peaking
C55	.01	400	C-8D-17270	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Video Coupling
C56	22		C-8G-11892	SI22	D6-220	5W5Q25	GP1K-22	19C23	V. Amp. Cath.
C57	.1	600	C-8D-17990	P688-1	DF-104	PTE6P1		6TM-P1	Video Coupling
C58	.1	400	C-8D-18861	P488-1	DF-104	PTE4P1		4TM-P1	Pic. Tube Cath.
C59	3.3		A-8G-12495-5	SI3.3NPO	TCZ-3.3		NPOK-3.3		S. IF Coupling
C60	.004	400	C-8D-17958	P688-004	D6-402	PTE6D4	GP2M-004	6TM-D4	S. IF Dec. Note 1
C61	5000		A-8G-13962	BPD-005	DD-502	1D5D5	811-005	29C1	S. IF Cath.
C62	470	500	C-8F3-121	1468-0005	D6-471	5W5T5	GP2K-470	1FM-35	Diode Load Cap Note 2
C63	2000		C-8G-19522	SI2000	D6-202	1W5D2	GP2M-002	29C2	De-emphasis
C64	4.7		A-8G-12495-6	SI4.7NPO	TCZ-4.7	5R5V5	NPOK-4.7	MS-55	Balancing †
C65	.01	200	C-8D-17258	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Audio Coupling

TV PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No	RATING CAP	VOLT	RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C68	.2	2000	C-8D-17365	P488-32	DT-203	DTE482		2TM-S2	Tone Comp.
C67	.01	1500	C-8D-17776	P488-01	DM-103	DTE481	821-01	4TM-S1	Audio Coupling
C66	5000		A-8C-17967	P488-005	DD-502	DTE6D5	811-005	6TM-D5	Tone Comp. Note 3
C65	.01	600	C-8D-17370	P488-01	D6-103	PTE481	821-01	4TM-S1	Audio Coupling
C64	.005	500	C-8D-17765	P688-006	D6-502	PTE6D5	811-005	6TM-D5	Tone Comp. Note 3
C63	.005	6000	C-8D-17768	P688-06	DF-203	DTE482	811-006	6TM-D5	Output Plate
C62	.02	2000	C-8D-17365	P488-32	DF-203	DTE482		2TM-S2	Integrator Net
C61	.05	400	C-8D-17446	P488-05		PTE485		4TM-S5	Vert. Discharge
C60	.25	400	C-8D-17364	P488-25		DTE425		4TM-P25	Vert. Sweep Coupling
C59	.1	500	C-8F-17421	P488-005	D6-471	9R1T5	GP2K-470	MS-35	Horiz. Sync. Coupling
C58	220	500	C-8F3-117	S1220	D6-221	5W5T25	GP2K-220	1FM-325	Hor. Feedback
C57	330	500	C-8F3-123	S1330	D6-331	1W5T7	GP2K-330	1FM-337	Voltage Divider
C56	680	500	C-8F3-133	S1680	D6-681	1W5T7	GP2K-680	1FM-37	Voltage Divider
C54	.02	200	C-8D-17268	P488-09	DF-203	PTE482		2TM-S2	AFC Filter
C55	270		C-8C-17454	S12700	D6-202	1W4D2	GP2M-302	2PC2	AFC Filter
C50	5000	500	C-8F3-132	S1464-304		1DH5D4		MS-24	Fixed Trimmer
C52	220	500	C-8F3-127	S1464-30025	D6-221	5R5T25	GP2K-220	MS-325	Hor. MV Feedback
C53	330	500	C-8F3-128	S1464	D6-331	5R5T3	GP2K-330	1MD14	Horiz. Discharge
C49	.05	600	C-8D-17533	P688-501	D6-502	PTE5D1	GP2L-501	6TM-D1	Hor. Sweep Coupling
C47	47		C-8D-17238	S147	D8-470	5W5Q5	GP1K-47	19C25	Hor. Feedback
C46	.1	600	C-8D-18580	P688-1	DF-104	PTE6P1		6TM-P1	Hor. Output Screen
C48	.05	400	C-8D-04486	P488-05	DF-503	PTE485		4TM-S5	Fixed Trimmer
C45	680		C-8G-04760	P474-680J5	TCN-150	5M6-F15	N750L-150	29C17	Fixed Trimmer
C44	5000		A-8C-03962	DPD-502	DD-502	1R5D5	811-005	29C1	RF Bypass
C43	.1	400	C-8D-17930	P488-1	DF-104	PTE4P1		4TM-P1	AF Amp. Screen Note 5
C42	.25	400		P488-025	D6-471	5R5T5	GP2K-470	MS-35	Fixed Trimmer Note 4
C41	.47	400		P488-005	D6-471	5R5T5	GP2K-470	MS-35	Differentiator Net Note 4

* Some models use 1 MFD in this application.
† Not used in all models.
‡ Some models use 5MMF in this application. Mfgrs. part # C-8G-11891.
§ Some models use 1000MMF in this application. Mfgrs. part # C-8G-13201
♦ Used only in chassis 16AY25 and 17AY21.
Note 1. Late production chassis 16AY28 and 17AY21 use .002MFD in this application.
Note 2. Some models use 560MMF in this application. Mfgrs. part # C-8F3-123.
Note 3. Some models use .01MFD in this application. Mfgrs. part # C-8D-17270.
Note 4. Used only in chassis 16AY21 and 17AY24.
Note 5. Used only in late production

CONTROLS

ITEM No	RATING RESISTANCE	WATTS	RAYTHEON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R4A	5000Ω		A-10A-18441		RTV-218	5BBT-617-S	Contrast control - panel
B	1Meg						Volume control and SW-tapped @ 100KΩ-rear
R2A	5MEG		A-10B-17764	Q11-123	AG-44-S	AN-31	Brightness control
B	Shaft		Not req.	Not req.	KSS-3	AK-1	Attach to R2A per instructions
R3A	1Meg		A-10B-19542	Q13-137	AG 63-Z	BSK-70	Tone control
B	Shaft		Not req.	Not req.	KSS-3	Not req.	Attach to R3A per instructions
R4A	100KΩ		A-10B-17275	Q11-128	AG 49-S	AN-40	Vert. hold control
B	Shaft		Not req.	Not req.	KSS-3	AK-1	Attach to R4A per instructions
R5A	5000Ω		A-10B-19218 ‡	Q11-114	AG 19-S	AN-10	Vert. linearity control
B	Shaft		Not req.	Not req.	FKS 1/4	AK-1	Attach to R5A per instructions
R6A	250KΩ		A-10B-19220 ‡		AG-61-S	AN-69	Vert. size control
B	Shaft		Not req.		FKS 1/4	AK-1	Attach to R6A per instructions

‡ Models 16AY21, and 17AY24 use control with part number A-10B-17766 in this application.
♦ Models 16AY21 and 17AY24 use control with part number A-10B-18240 in this application.

RESISTORS

ITEM No	RATING RESISTANCE	WATTS	RAYTHEON PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE STATED
R7	47Ω		C-9B-94	BTS-470K	Antenna Isolation
R8	56Ω		C-9B1-60	BTS-680	Antenna Coil Shunt
R9	10KΩ		C-9B1-74		RF Amp. Grid
R11	68Ω		C-9B1-48		RF Amp. Cathode
R10	1000Ω	20%	C-9B-13	BTS-1000	RF Amp. Screen
R12	56.00Ω		C-9B1-71		RF Coil Shunt
R13	68KΩ		C-9B1-84		Converter Grid
R14	22000Ω		C-9B1-86	BTS-2200	Converter Cathode - See Note 1
R15	1000Ω	20%	C-9B-13	BTS 1000	Converter Decoup
R16	47KΩ		C-9B-74		Osc. Grid
R17	10Ω		C-9B1-38		Parasitic Supp
R18	10Ω		C-9B1-38		Parasitic Supp
R19	82000Ω		C-9B2-73		Osc. Plate
R20	1000Ω	20%	C-9B1-13	BTS-1000	AGC Network
R21	82000Ω		C-9B1-73		1st Video IF Amp. Grid
R22	82Ω		C-9B1-49	BTS-82	1st Video IF Amp. Cathode
R23	1000Ω	20%	C-9B1-13	BTS-1000	1st Video IF Amp. Decoup
R24	1000Ω	20%	C-9B1-13	BTS-1000	AGC Network
R25	680Ω	20%			2nd Video IF Amp. Grid - See Note 2
R26	82Ω		C-9B1-49	BTS-82	2nd Video IF Amp. Cathode
R27	1000Ω	20%	C-9B1-13	BTS-1000	2nd Video IF Amp. Cathode
R28	1000Ω	20%	C-9B1-13	BTS-1000	AGC Network
R29	68000Ω	20%			3rd Video IF Amp. Grid - See Note 2
R30	82Ω		C-9B1-49	BTS-82	3rd Video IF Amp. Cathode
R31	1000Ω	20%	C-9B1-13	BTS 1000	3rd Video IF Amp. Decoup
R32	68000Ω	20%			4th Video IF Transformer Shunt
R33	820Ω		C-9B1-51	BTS-120	4th Video IF Amp. Cathode
R34	68KΩ				4th Video IF Amp. Screen
R35	5600Ω		C-9B1-71		4th Video IF Amp. Decoup
R36	12KΩ				5th Video IF Transformer Shunt
R37	3300Ω		C-9B1-62	BTS-1000	Osc. Decoup
R38	3900Ω			BTS-3900	Video Det. Diode Load
R39	10KΩ		C-9B1-74	BTS-10K	AGC Keying Grid
R40	2200Ω		C-9B1-86	BTS-2200	Video Amp. Plate
R41	1000Ω		C-9B1-62	BTS-1000	Video Amp. Plate
R42	47KΩ	2	C-9B4-82	BTB-47K	Voltage Divider - See Note 3
R43	47000Ω	2	C-9B4-70	BTB-4700	Voltage Divider -

RESISTORS (CONT.)

ITEM No	RATING RESISTANCE	WATTS	RAYTHEON PART No.	IRC PART No.	IDENTIFICATION CODES
R44	18000Ω	10	C-9C14-1099	13/4A-1003	Voltage Divider - Wire Wound
R45	2.2Meg	½	C-9B1-102	BTS 2.2Meg	Video Output Grid - See Note 3
R46	100Ω	½	C-9B1-50	BTS-100	Video Output Cathode
R47	4700Ω	2	C-9B4-70	BTB-4700	Video Output Plate
R48	47KΩ	½		BTA-47K	Video Peaking Coil Shunt
R49	12480Ω	10	C-9C14-1100	13/4A-1260	Voltage Divider - Wire Wound
R50	220Ω	½	C-9B1-66	BTS-220Ω	AGC Network
R51	68KΩ 20%	½	C-9B1-84	BTS-68K	AGC Network
R52	33KΩ	½		BTA-33K	AGC Network
R53	1Meg	½	C-9B1-98	BTS 1Meg	DC Restorer Diode Load
R54	22KΩ	½	C-9B1-78	BTS-22K	Picture Tube Grid
R55	100KΩ	½	C-9B1-86	BTS-100K	Picture Tube Cathode
R56	1000Ω	½	C-9B1-62	BTS-1000	Accelerator Anode Load
R57	68KΩ 20%	½	C-9B1-84	BTS-68K	Voltage Divider
R58	120Ω	½	C-9B1-51	BTS-120	Sound IF Amp. Cathode
R59	2200Ω	½	C-9B1-86	BTS-2200	Sound IF Amp. Decoup
R60	22KΩ	½	C-9B1-78	BTS-22K	De-emphasis
R61	22KΩ	½	C-9B1-78	BTS-22K	Ratio Det. Diode Load
R62	47KΩ	½		BTA-47K	Tone Compensation
R63	15Meg 20%	½	C-9B1-37	BTS 15Meg	AF Amp. Grid - See Note 11
R64	1M Ω	½	C-9B1-98	BTS 1Meg	AF Amp. Screen See Note 4
R65	220KΩ	½	C-9B1-90	BTS 220K	AF Amp. Plate - See Note 5
R66	470KΩ	2	C-9B1-94	BTS 470K	Output Grid
R67	820Ω	½	C-9B2-61	BTA 820	Output Cathode
R68	1000Ω	2	C-9B4-62	BTB-1000	Decoup. See Note 8
R69	4.7Meg	½	C-9B1-106	BTS 4.7Meg	Sync. Sep. Grid
R70	68KΩ	2	C-9B4-84	BTB 68K	Sync. Sep. Plate
R71	6800Ω	½	C-9B1-72	BTS-6800	Voltage Divider - See Note 9
R72	2.2Meg	½	C-9B1-102	BTS-2 2Meg	Sync. Amp. Grid - See Note 3
R73	47KΩ	2	C-9B4-82	BTB 47K	Sync. Amp. Plate - See Note 3
R74	47KΩ	½		BTA-47K	Integrator
R75	1.5Meg	½	C-9B1-100	BTS-1.5Meg	Vert. Osc. Grid
R76	220KΩ	½	C-9B1-90	BTS 220K	Vert. Osc. Plate
R77	1Meg	½	C-9B1-98	BTS-1Meg	Vert. Output Grid
R78	1000Ω	½	C-9B1-62	BTS-1000	Vert. Output Cathode
R79	47KΩ	½		BTA-47K	Voltage Divider
R80	470KΩ	½	C-9B1-94	BTS-470K	Voltage Divider
R81	220KΩ	½	C-9B1-90	BTS-220K	Voltage Divider
R82	3300Ω	½	C-9B1-68	BTS-3300	Vert. Peaking
R83	150KΩ	½	C-9B1-88	BTS-150K	Horiz. Discr. Diode Load
R84	2.2Meg	2	C-9B1-102	BTS 2.2Meg	Horiz. Discr. Diode Load - See Note 3
R85	2.2Meg	½	C-9B1-102	BTS-2.2Meg	Horiz. Discr. Diode Load - See Note 3
R86	150KΩ	½	C-9B1-88	BTS-150K	Horiz. Discr. Diode Load
R87	68KΩ 20%	½	C-9B1-84	BTS-68K	Horiz. Peaking
R88	1500Ω	½	C-9B1-64	BTS-1500	Horiz. MV Cathode
R89	5600Ω	2		BTB 5600	Horiz. MV Plate
R90	120KΩ 5%	½		BTS-120K-5%	Horiz. MV Grid
R91	270KΩ	½		BTS-270K	Horiz. MV Plate
R92	220Ω	½			Parasitic Supp
R93	1Meg	½	C-9B1-98	BTS-1Meg	Horiz. Output Grid
R94	4700Ω	2	C-9B4-70	BTB-4700	Horiz. Output Screen
R95	470KΩ	½	C-9B1-94	BTS-470K	Horiz. Feedback - See Note 4
R96	330KΩ 5%	½		BTS 330-5%	Horiz. Feedback - See Note 6 and 7
R97	5600Ω	3			Voltage Divider - Wire Wound - See Note 16
R98	10Ω	½	C-9B1-38	BW-½-10	Centering Network
R99	470KΩ	½	C-9B1-94	BTS 470K	Isolation
R100	47KΩ	½	C-9B1-82	BTS 47K	Differentiator See Note 10

Note 1 Some models use 1200Ω resistor in this application.
Note 2 Some models use 8200Ω resistor in this application.
Note 3 Some models use series resistors in this application
Note 4. Used only in late production models.
Note 5. Late production models use 470KΩ resistor in this application.
Note 6. Late production models use 680KΩ resistor in this application.
Note 7. Models 16AY21 and 17AY24 use 220KΩ resistor in this application.
Note 8. Models 16AY21 and 17AY24 use 2700Ω 5 watt resistor with part number C-9C12-1104 in this application.
Note 9. Models 16AY21 and 17AY24 use 8200Ω resistor in this application.
Note 10. Used only in models 16AY21 and 17AY24.
Note 11. Some models use 10Meg resistor in this application.
Note 16. Used only when horizontal output trans. part # C201-19533-1 is used.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ 2A	680VCT .250ADC	5V @ 3A	6.3V @ 9A SEC. 4 6.3V @ 1.5A	C12A18399 C12A18399-1 ⑤	P-8159 & ⑧ P-5014 ⑦	P3059 & ⑥ P2945 ⑦	TP-395 & ⑧ FO-8 ⑦

⑤ Alternate part number.
⑥ Add series resistor to reduce voltage.
⑦ Mount beneath chassis.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	SEC.	RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	160Ω	930Ω	B12M-18241		A-3000	TB0-1 ①	Vert. Block Osc. Trans.
T3	205Ω tap @ 30Ω	8Ω tap @ .5Ω SEC. 2 21Ω tap @ 10.5Ω SEC. 3 0Ω	C201-19533-1 C201-19533 ⑧ C12M-19407-2 ⑧				Horiz. Output Trans.
T4	730Ω tap @ 9Ω B 6Ω	14Ω	B-12C19048	A-8112 ①	A-3038	TSO-5	Vert. Output Trans.
T5A			C201-19490	DY-7	MD-70F		Horiz. Deflection Coil Vert. Deflection Coil

① Drill one new mounting hole.
⑧ Alternate parts for chassis 16AY21.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	RATING IMPEDANCE PRI.	SEC.	DC RES PRI.	SEC.	RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T6	8KΩ	3.2Ω	45Ω	.8Ω	B12C 18743	A-8114 ①	A-2931	HO-16 ①	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP	RAYTHEON PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1A	12"	PM	4Ω	B18A-19544	12J12	18A4	
B		PM		C18A-18865 ②			② Used in console models.
C	6"	PM	3.2Ω	C18A-18745 ③			③ Used in table models.

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	D C RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	RAYTHEON PART No	STANCOR PART No	MERIT PART No	CHICAGO PART No	INSTALLATION NOTES
L1	.240A	35Ω	1.4Henries	B-16A-17959	C-2326 ①	C-2974 ①	TH 3300 ①	① Drill one new mtg. hole
L2	.240A	35Ω	1.4Henries	B-16A 17959	A 2326 ①	A 2326 ①	TR-3300 ①	

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	SEC.	RAYTHEON PART No.	MEISSNER PART No.	NOTES
L3	Antenna Coil	0Ω	0Ω	B-20I 17143		High band
L4	Antenna Coil	.1Ω	1Ω			Low band(part of L3)
L5	RF Choke	9Ω		A 16A 17128		
L6	RF Coil Primary	.1Ω		B-13E-17140		High band
L7	RF Coil Secondary	.1Ω		B-13E-17140		High band
L8	RF Coil Primary	.1Ω		B-13E-12046		Low band
L9	RF Coil Secondary	.1Ω		B-13E-12046		Low band
L10	Osc. Coil	.1Ω		B-13E-17140		High band
L11	Osc. Coil	.1Ω		B-13D-12155		Low band
L12	Conv. Plate Trap	1Ω		A-16A-18025		
L13	1st Video IF	.3Ω		B-13M-19521		
L14	Fil. Choke	.3Ω		A-20I-15609		
L15	2nd Video IF	.1Ω		A-20I-15612		
L16	3rd Video IF	.1Ω		A-20I-15612		
L17	4th Video IF	.1Ω		A-20I-15612		
L18	Grid Choke	2.3Ω		A-20I-15608		
L19	5th Video IF	.9Ω	.9Ω	B-13B-18784		
L20	Fil. Choke	1.2Ω		A-16A 17937		
L21	Peaking	10Ω			19-1920	83 Microhenries
L22A	4.5MC Trap	1.5Ω		B-20I-19458		Includes L23 and C53(chassis 16AY28 and 17AY21)
B	4.5MC Trap			B-20I-19363		Includes L23 and C53(chassis 16AY21I and 17AY24)
L23	Peaking	25Ω			19-1522	410 Microhenries (part of L22)
L24	Peaking	7.5Ω		A-16A-19485	19-1922	240 Microhenries
L25	Peaking	9.5Ω		A-16A-19486		
L26	Sound IF	3.7Ω		B-13A-19514		
L27A	Ratio Det. Trans	4.3Ω	.2Ω	B-13M-17273		Used in chassis with 6T8 Ratio Det. -AF Amp.
B	Ratio Det. Trans.			B-13M-19257		Used in chassis with 6AL5 Ratio Det. and 6AU6 AF Amp
L28A	Horiz. Freq.	80Ω		A-13D-19540		Chassis 16AY28 and 17AY21.
B	Horiz. Freq			A-13D-19355		Chassis 16AY21I and 17AY24
L29	Horiz. Lin.	11.5Ω		A-13M-19499		Resistance includes series 10Ω resistor.
L30	Horiz. size	.2Ω		A-13M-18233		

FUSES

ITEM No.	TYPE	RATING	RAYTHEON PART No. FUSE	RAYTHEON PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	REMARKS
M2	3AG	1/4A	A46B-18362	A-55F-18024	312.250		

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M1	RF Tuner		
M3	Switch	A-20F-12108	TV-Phono
M4	Focus Magnet	B-55P 19497	
M5A	Ion Trap	B-16M-18623	
B	Ion Trap	B-16M-19706	Alternate
C	Ion Trap	B-16M-19343	Alternate
D	Ion Trap	B-16M-19705	Alternate
E	Ion Trap	B-16M-19337	Alternate
F	Ion Trap	B-16M-17982	Alternate
B2	Trimmer	A-8E-18508	Horizontal Drive(80-480MMF)
	Escutcheon	R-2M-19308	
	Safety Glass	B-30M-19332	
	Knob	B-5B-19349-76	Channel indicating (mahogany)
	Knob	B-5B-19349-56	Channel indicating (blond)
	Knob	B-5B-19348-76	Tuning (mahogany)
	Knob	B-5B-19348-56	Tuning (blond)
	Knob	B-5B-19351-76	Contrast (mahogany)
	Knob	B-5B-19351-56	Contrast (blond)
	Knob	B-5B-19350-76	Volume (mahogany)
	Knob	B-5B-19350-56	Volume (blond)
	Knob	A-5B-19510-29	Star shape for brightness, tone, vert. hold
	Knob	B-5B-18382-36	Antenna

RAYTHEON MODELS C-1615A, B, 16A, B, C-1714B; 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B; 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B; RC-1718B, 19B

RADIO PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		RAYTHEON PART No.	STANDARD REPLACEMENT		
V23	Converter	12BE6	12BE6	7CH	
V24	IF Amplifier	12BA6	12BA6	7BK	
V25	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V26	Power Output	50C5	50C5	7CV	
V27	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C98A	60	150	A-8C-19085	AF101010D4A		EZ55515C		{TVA-2453	Filter Red
B	50	150						{USE TWO	Filter Yellow
C	50	150							Filter Blue
D	40	25							Output Cathode Green
C99	.05	200	C-8D-10770	P288-05	DF-503	PTE4S5		2TM-S5	AVC Filter
C100A	50		*A-201-15005	{SI50	*PC-50	5W5Q5	GP1K-50	19C28	Diode RF Filter
B	50			{SI50		5W5Q5	GP1K-50	19C28	Diode RF Filter
C101	.09	400	C-8D-11251	P488-1	DF-104	PTE4P1		4TM-P1	Phono Isolation
C102	.02	400	C-8D-11304	P488-02	DF-203	PTE4S2		4TM-S2	Audio Coupling
C103	220		C-8G-14459	SI220	D6-221	5W5T25	GP2K-220	19C13	AF Amp. Plate
C104	.005	600	C-8D-10935	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Tone Comp.
C105	.01	400	C-8D-10761	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Tone Comp.
C106	.05	200	C-8D-10770	P288-05	DF-503	PTE4S5		2TM-S5	Audio Coupling
C107	.005	600	C-8D-10935	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Output Plate
C108	.18	400	C-8D-11111	P488-22		GT4P2		72P53	Line Isolation
C109	.047	400	C-8J-16081	P488-047	DF-503	PTE4S5		4TM-S47	Line Filter

* Items C100A, C100B, and R106 are combined into one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESISTANCE	WATTS	RAYTHEON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	
R101A	1Meg	½	A-10A-19005	Q18-137X	AK-111	BTSK-72-S	Volume control - tapped @ 100KΩ
B	Shaft		Not req.	Not req.	KSS-3	Not req.	Attach to R101A per instructions.
C	Switch		Not req.	76-1	SWB	Not req.	Attach to R101A per instructions.
R102	1Meg	½	A-11A-19004				Tone control and Radio-Phono SW

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RAYTHEON PART No.	IRC PART No.	
R103	47KΩ	1	C-9B1-82		Mixer Grid
R104	2.2Meg	½	C-9B1-33	BTS-2.2Meg	AVC Network
R105	150Ω	½	C-9B1-52	BTS-150	IF Amp. Cathode
R106	47KΩ	½	A-201-15005 *	BTS-47K	Diode Filter
R107	6.8Meg	½	C-9B1-36	BTS-6.8Meg	AF Amp. Grid - See Note 12
R108	220KΩ	½	C-9B1-90	BTS-220K	AF Amp. Plate
R109	33KΩ	½	C-9B1-80	BTS-33K	Tone Compensation
R110	470KΩ	½	C-9B1-29	BTS-470K	Output Grid
R111	150Ω	½	C-9B1-52	BTS-150	Output Cathode
R112	1000Ω	1	C-9B2-62	BTA-1000	Filter - See Note 13
R113	150Ω	1	C-9B2-52	BTA-150	Filter - See Note 15
R114	33Ω	1			Surge Limiter - See Note 14
R115	220KΩ	½	C-9B1-90	BTS-220K	Isolation

* Items R106, C100A and C100B are combined into one unit.

Note 12. Some models use 6.2meg resistor in this application.

Note 13. Some models use 1100Ω resistor in this application.

Note 14. Some models use 27Ω resistor in this application.

Note 15. Some models use parallel resistors in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T7	5.5KΩ	4Ω	200Ω	.6Ω	B12C-19009	A-3877 ①	A-3019	RO-9 ①	① Drill one new mtg hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	RAYTHEON PART No.	MEISSNER PART No.	
L31	Loop Antenna	2.3Ω		C-13E-19087		
L32	Osc. Coil	.9Ω	6Ω	B-13D-19064		
L33	1st IF	16Ω	16Ω	B-13B-17731		
L34	2nd IF	16Ω	16Ω	B-13B-17731		

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA							REMARKS
	RAYTHEON PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M6		AC-AG-J	A-AG	W26B	A66U	33	O-2 or S-2	

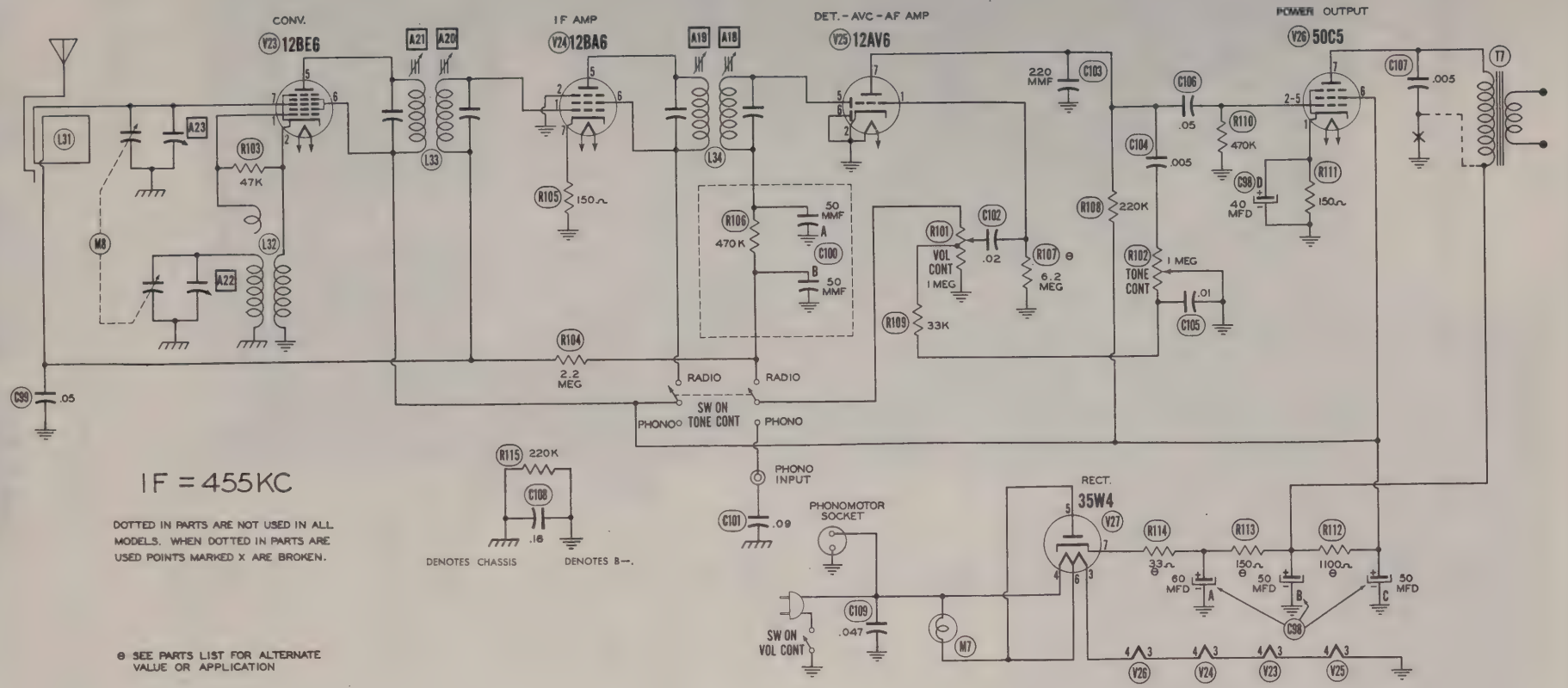
ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED.

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					RAYTHEON PART No.		
M7	Bayonet	6-8	.15	Brown			Type # 47

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M8	Tuning Capacitor	B-8A-18997	30-496MMF, 26-197MMF
	Dial Scale	B-30A-19432	
	Escutcheon	B-2G-18920	
	Knob	B-5B-18877-76	With line (mahogany)
	Knob	B-5B-18877-75	With line (blond)
	Knob	B-5B-18876-76	Mahogany
	Knob	B-5B-18876-56	Blond



IF = 455KC

DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V23	12BE6	‡-5.3VDC	0V	12VAC	26VAC	80VDC	80VDC	-.4VDC
V24	12BA6	-.4VDC	0V	26VAC	38VAC	80VDC	80VDC	1.2VDC
V25	12AV6	-.7VDC	0V	0V	12VAC	-.5VDC	0V	55VDC
V26	50C5	5.4VDC	.2VDC	38VAC	90VAC	.2VDC	80VDC	95VDC
V27	35W4	0V	0V	90VAC	117VAC	110VAC	110VAC	110VDC

‡ TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V23	12BE6	47KΩ	.9Ω	12Ω	25Ω	†1.2KΩ	†1.2KΩ	3.2Meg
V24	12BA6	3.2Meg	0Ω	25Ω	37Ω	†1.2KΩ	†1.2KΩ	150Ω
V25	12AV6	6.2Meg	0Ω	0Ω	12Ω	1Meg	0Ω	†220KΩ
V26	50C5	150Ω	470KΩ	37Ω	90Ω	470KΩ	†1.2KΩ	†380Ω
V27	35W4	Inf.	Inf.	90Ω	120Ω	115Ω	115Ω	55KΩ

RADIO-PHONO SWITCH IN RADIO POSITION

† MEASURED FROM PIN 7 OF V26.

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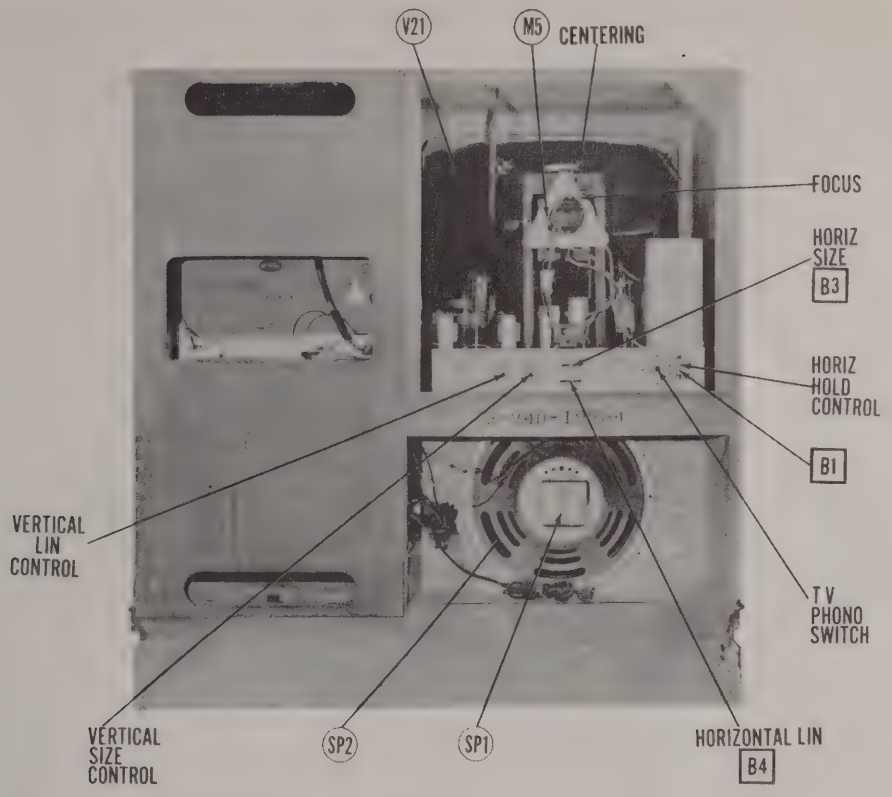
RAYTHEON MODELS C-1615A, B, 16A, B; C-1714B, 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B

RADIO SCHEMATIC

RAYTHEON MODELS C-1615A, B, 16A, B, C-1714B; 15A, B, 16A, B, 18A, 19A; M-1611A, B, 12A, B, 13A, B, 14A, B; M-1711A, B, 12A, B, 13A, B, 14A; RC-1618A, B, 19A, B, RC-1718B, 19B



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold thumbscrew clockwise, until it reaches the stop and then two complete turns counter-clockwise.

Adjust the horizontal hold slug (B1) until the picture synchronizes horizontally.

Some models do not have a thumbscrew, on those models the slug is adjusted by means of a crimped eyelet on the end of the slug.

Adjust the horizontal size (B3) to minimum (extreme right, looking at rear of chassis.)

Adjust the horizontal linearity (B4) to minimum (extreme right.)

Turn the horizontal drive trimmer (B2) counter-clockwise until a fold over occurs as indicated by a vertical white line in the picture. Then turn the trimmer clockwise until the fold over disappears and then clockwise an additional 1/2 turn.

Adjust B3 until the picture fills the mask horizontally.

Adjust B4 until the picture is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS -MODEL RC-1718B

TV CHASSIS REMOVAL

1. Remove four push-on type control knobs.
2. Remove two 1/4" hex head metal screws, and two wood screws securing rear cover to cabinet. Remove rear cover.
3. Disconnect built-in antenna.
4. Disconnect speaker.
5. Remove five 1/4 x 20" bolts holding chassis to cabinet. Remove chassis.
6. Remove four 5/16" hex nuts from speaker. Remove speaker.

RADIO CHASSIS REMOVAL

1. Disconnect phonograph leads.
2. Remove three 1/4" hex head bolts from chassis.
3. Remove phono-radio drawer.
4. Remove radio chassis.

NOTE: FOR PICTURE TUBE REMOVAL, IT IS NECESSARY TO REMOVE TV CHASSIS AS OUTLINED ABOVE.

PHOTOFACT* Folder

SENTINEL MODELS
1U420B, 1U423, 1U424, 420B, 423, 424

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 420B

SENTINEL MODELS
1U420B, 1U423, 1U424, 420B, 423, 424

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Date 2/51 Set No. 124—Folder No. 9

SENTINEL MODELS
1U420B, 1U423, 1U424, 420B, 423, 424

SENTINEL MODEL 420B

TRADE NAME	Sentinel, Models 1U420B, 1U423, 1U424, 420B, 423, 424
MANUFACTURER	Sentinel Radio Corp., 2100 Dempster St., Evanston, Illinois
TYPE SET	Television Receiver
TUBES	Twenty One
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	1.7 Amp. at 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

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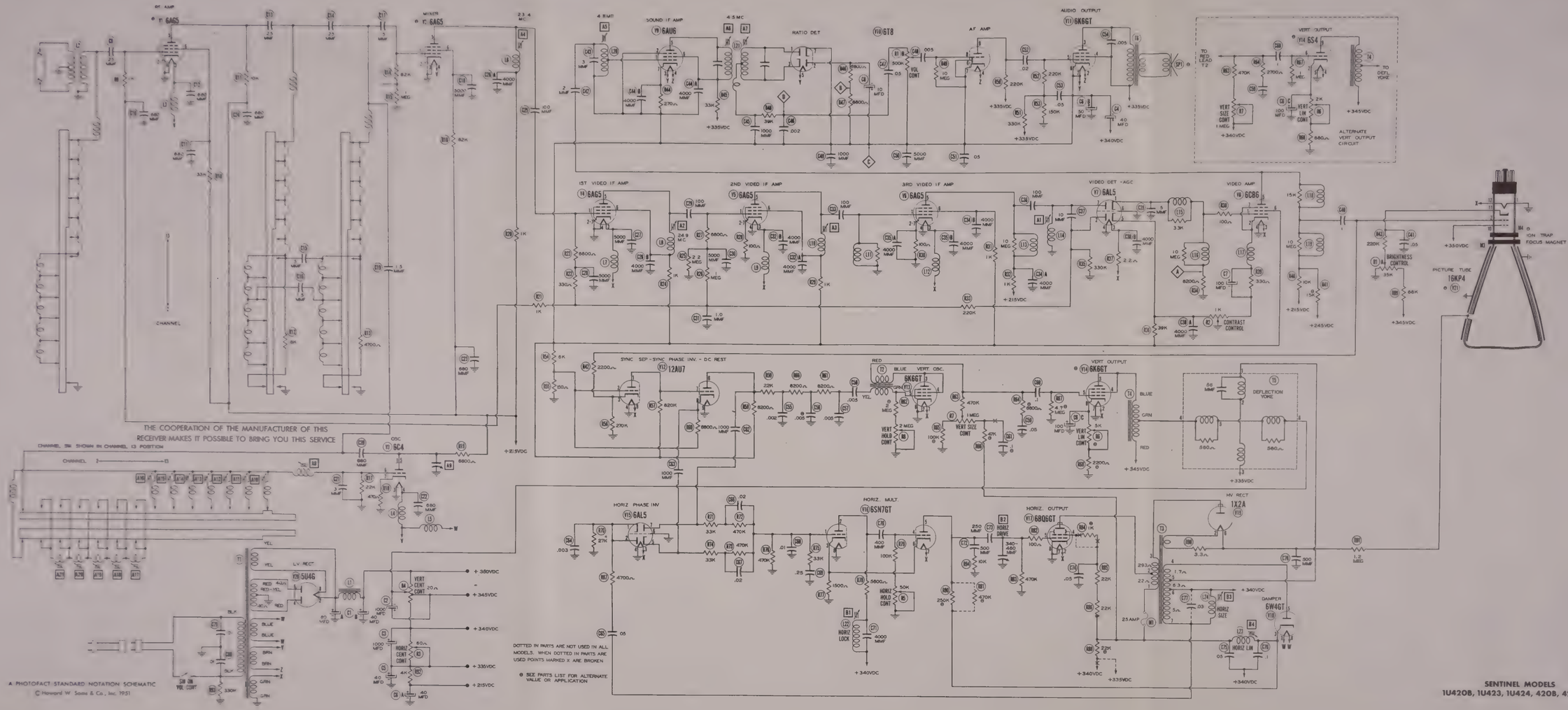

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CHANNEL SW. SHOWN IN CHANNEL 13 POSITION

DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN

⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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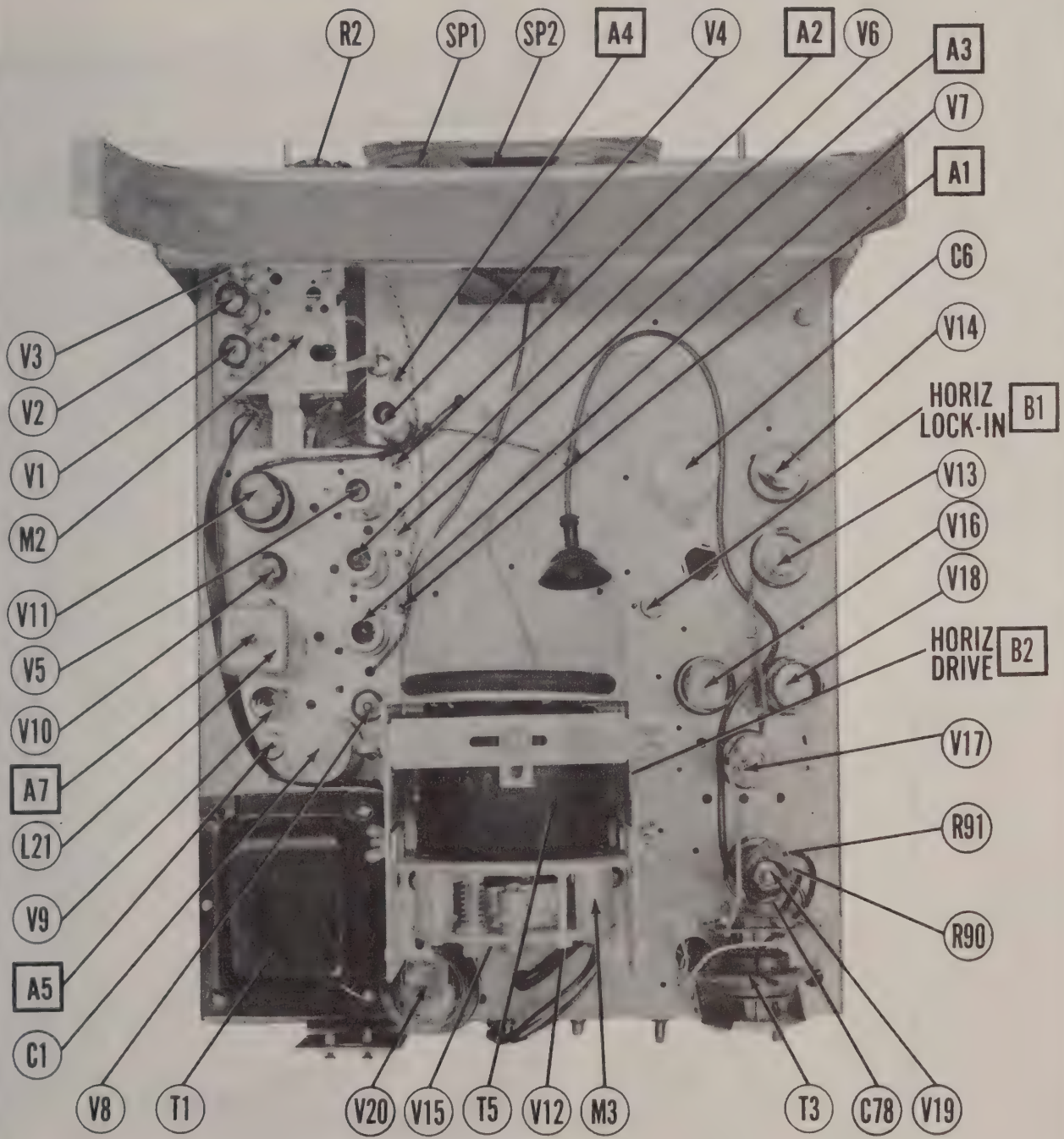
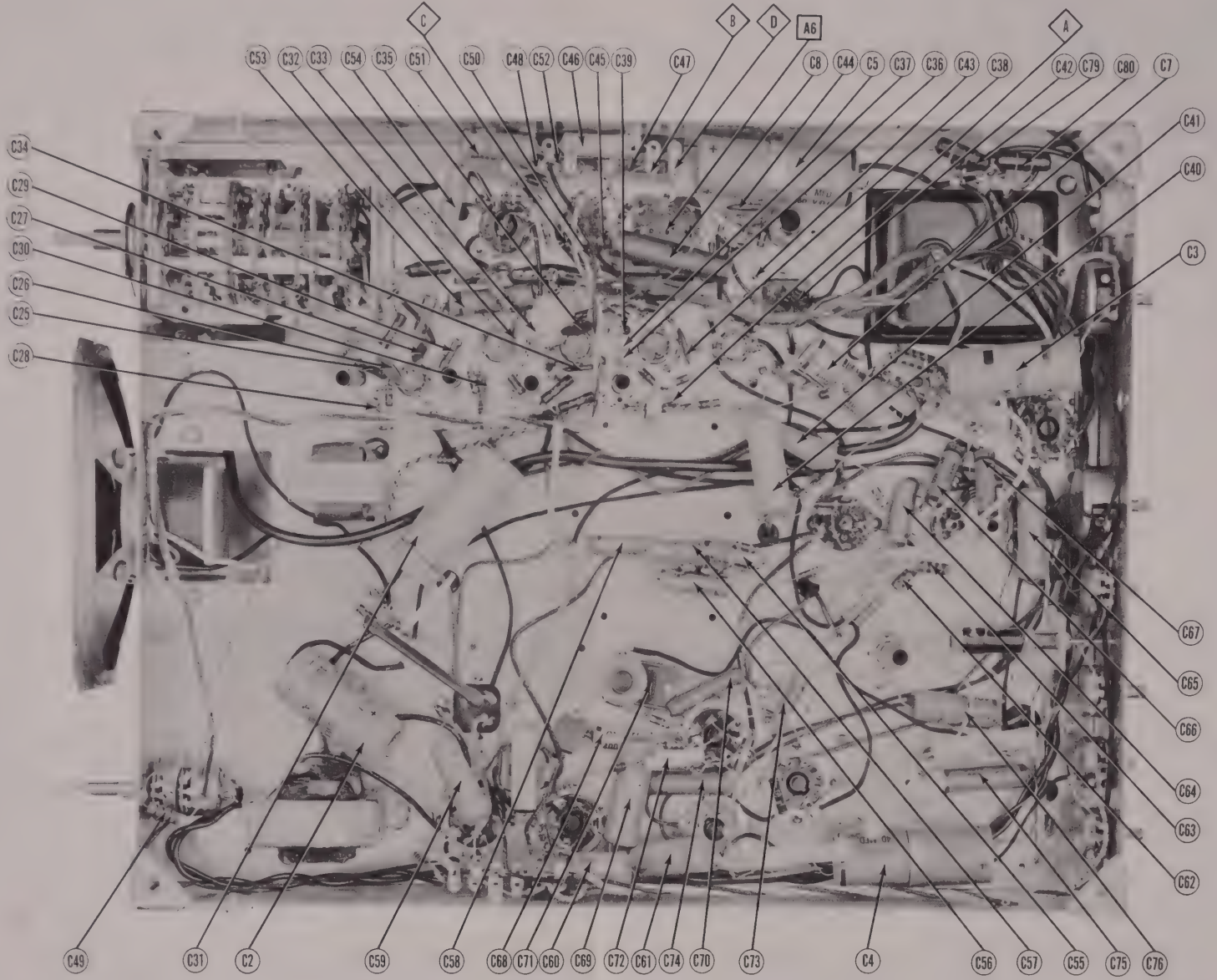
SENTINEL MODELS
1U420B, 1U423, 1U424, 420B, 423, 424

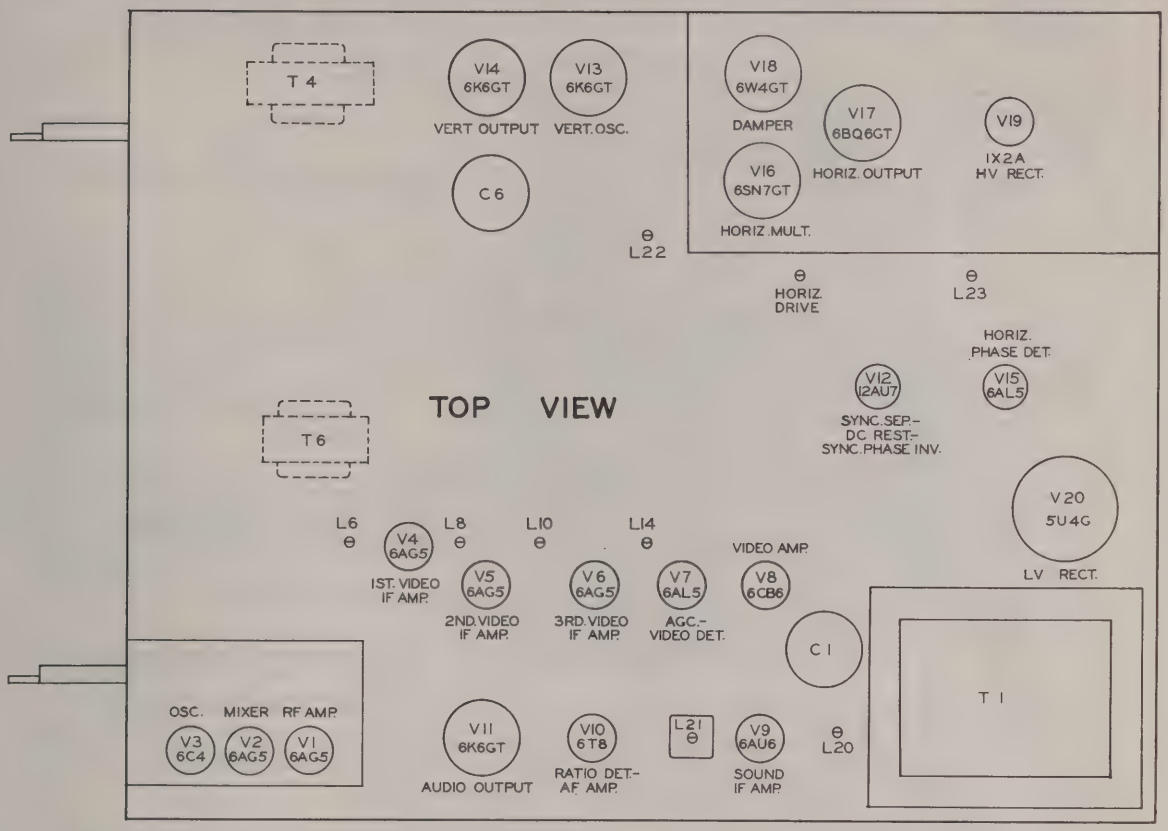
SENTINEL MODELS
1U420B, 1U423, 1U424, 420B, 423, 424

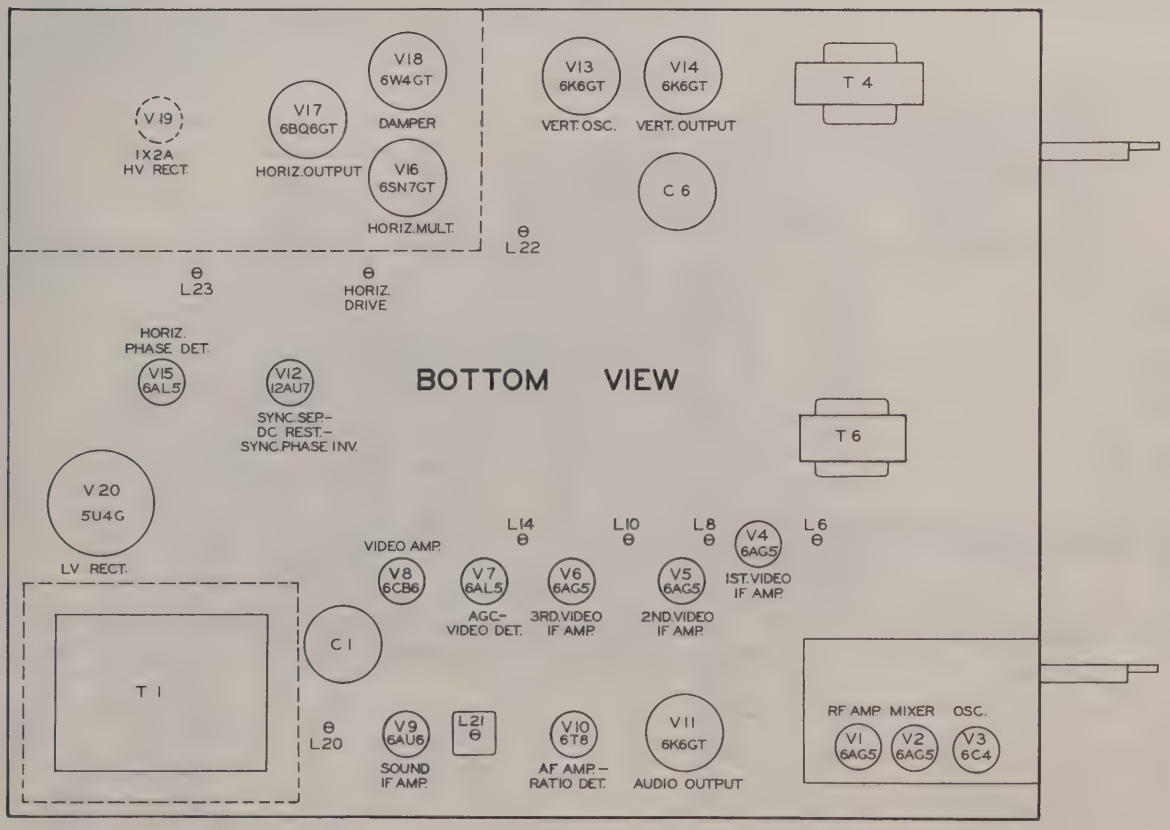


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 4.5 volt battery to the junction of R33 and C31, connect the positive lead to chassis.
Remove the oscillator tube (V3) from its socket to eliminate the possibility of erroneous indications.
Turn the contrast control to minimum (counter-clockwise).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	25.75MC (Unmod.)	Any	DC probe thru 47KΩ to point (A). Common to chassis.	A1	Adjust for maximum deflection. Attenuate signal generator to maintain 1 volt reading.
2.	"	"	24.9MC	"	"	A2	"
3.	"	"	23.4MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	24MC (10MC SWP)	21MC 25.5MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response curve similar to fig. 1. If necessary retouch A1 thru A5 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

During sound IF alignment the common lead of the VTVM is connected to approximately 140 volts with respect to chassis. Avoid touching or grounding the VTVM case.
Turn the contrast control to the mid-position of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 6CB6 (V8). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to point (C)	A5, A6	Adjust for maximum deflection.
6	"	"	"	"	DC probe to point (D). Common to point (B).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

After alignment is completed, restore set to original operating condition and tune in a TV station. If intercarrier buzz is present at low contrast, adjust A7 slightly to minimize the buzz.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use the frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 6CB6 (V8). Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C8. Adjust for maximum amplitude and symmetry as per figure 2.
6.	"	"	"	"	Any	Vert. amp. to point (D). Low side to chassis.	A7	Reconnect capacitor C8. Adjust A7 so 4.5MC occurs at center of crossover lines as per figure 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Replace the local oscillator tube (V3) in its socket.
The high channel oscillator trimmer (A8) should be adjusted only if one of the high channel oscillator slugs shows insufficient range. Adjustment of A8 will necessitate the readjustment of ALL HIGH BAND channels.
The overall oscillator trimmer (A9) should be adjusted only if any low band oscillator adjustment shows insufficient range, or if adjustment of A8 will not correct a high band deficiency. If A9 is adjusted, readjust ALL channels, both high and low band.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. amp. to point (A). Low side to chassis.	A10	Adjust to place video marker at 50% response as shown in figure 4. The sound marker should be at 5%.
			207MC (10MC SWP)	205.25MC 209.75MC	12		A 11	
			201MC (10MC SWP)	199.25MC 203.75MC	11		A12	
			195MC (10MC SWP)	193.25 MC 197.75MC	10		A13	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A14	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A15	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A16	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A17	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A18	
			69MC (10MC SWP)	67.25MC 71.75MC	4		A19	
			63MC (10MC SWP)	61.25MC 65.75MC	3		A20	
			57MC (10MC SWP)	55.25MC 59.75MC	2		A21	

The RF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

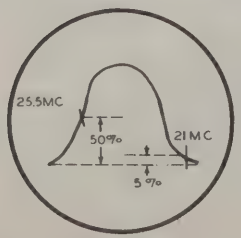


FIG. 1

FIG. 2

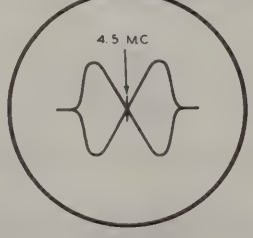


FIG. 3

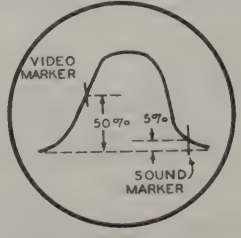
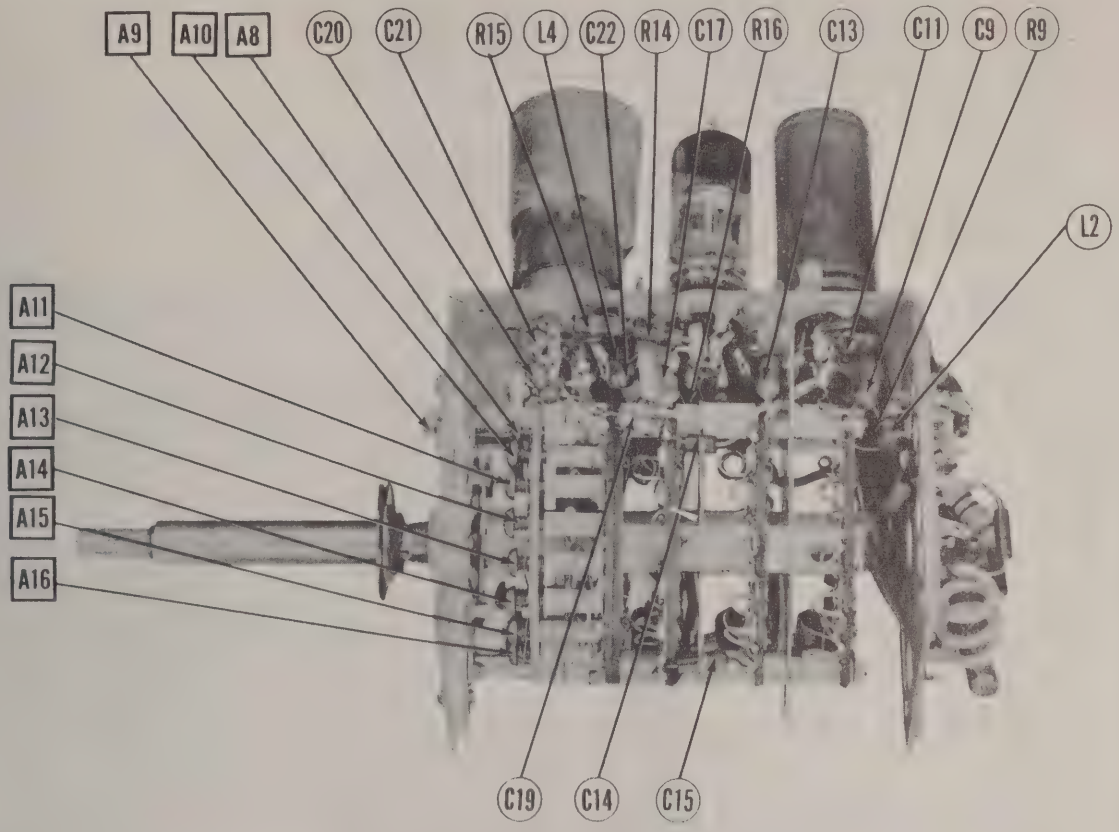
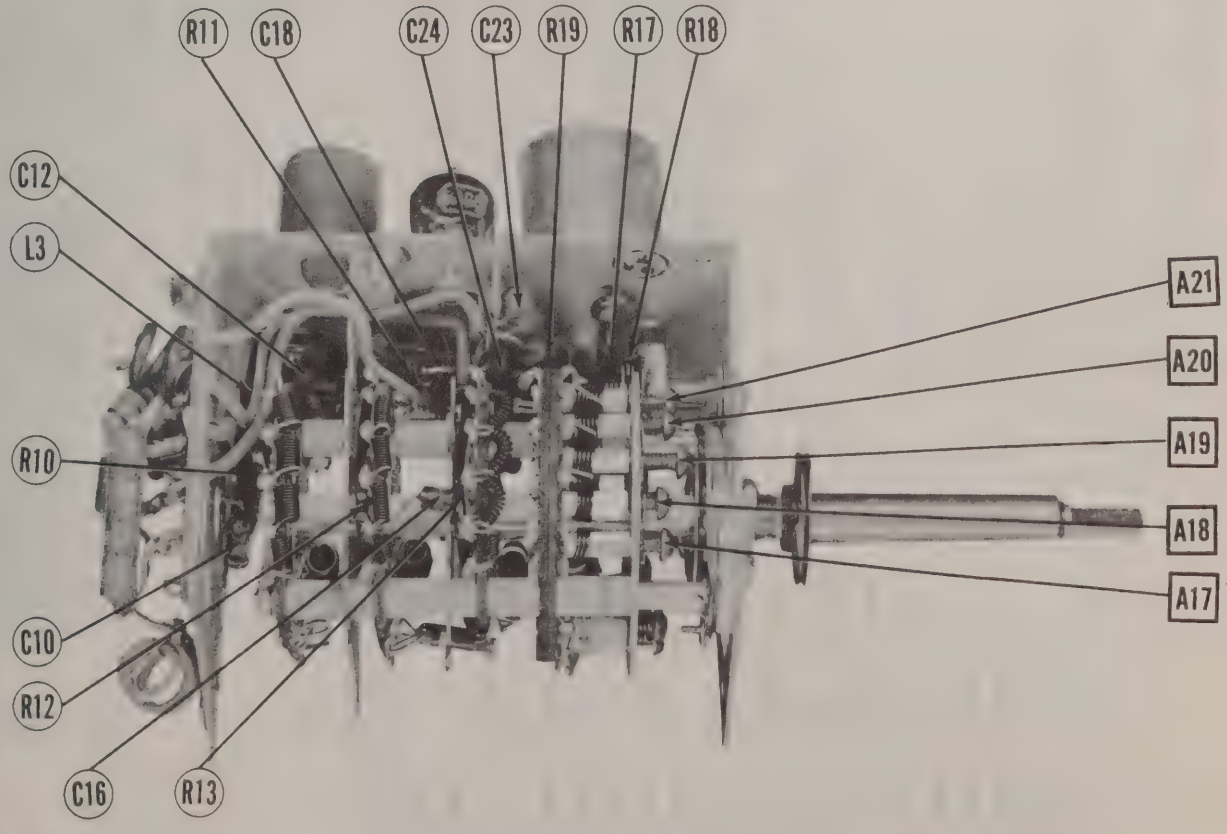


FIG. 4



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.8VDC	0V	6.3VAC	0V	130VDC	120VDC	0V		
V 2	6AG5	-1.3VDC	0V	0V	6.3VAC	200VDC	125VDC	0V		
V 3	6C4	150VDC	0V	0V	6.3VAC	150VDC	§-.9VDC	4VDC		
V 4	6AG5	-.8VDC	0V	5.7VAC	0V	125VDC	125VDC	0V		
V 5	6AG5	-.2VDC	.4VDC	5.7VAC	0V	125VDC	125VDC	.4VDC		
V 6	6AG5	0V	1.2VDC	5.7VAC	0V	200VDC	125VDC	1.2VDC		
V 7	6AL5	.8VDC	-1.4VDC	5.5VAC	0V	0V	0V	0V		
V 8	6CB6	.4VDC	4.9VDC	6.3VAC	0V	250VDC	130VDC	4.9VDC		
V 9	6AU6	#0V	#0V	#0V	#6.3VAC	#85VDC	#85VDC	#1VDC		
V 10	6T8	#-.2VDC	#-.7VDC	#.2VDC	#6.3VAC	#0V	#0V	#0V	#-.3VDC	#75VDC
V 11	6K6GT	0V	#6.3VAC	#190VDC	#210VDC	#-8.5VDC	#-10VDC	#0V	#0V	
V 12	12AU7	45VDC	5.2VDC	9VDC	0V	0V	90VDC	45VDC	45VDC	6.3VAC
V 13	6K6GT	0V	0V	320VDC 25VDC	320VDC 25VDC	-50VDC -60VDC	-30VDC -0VDC	6.3VAC	0V	
V 14	6K6GT	350VDC	6.3VAC	335VDC	335VDC	0V	0V	0V	55VDC 40VDC	
V 15	6AL5	-.1VDC	-.1VDC	6.3VAC	0V	17VDC	0V	-6VDC		
V 16	6SN7GT	2VDC	300VDC	16VDC	-8VDC -11VDC	195VDC	16VDC	6.3VAC	0V	
V 17	6BQ6GT	135VDC	6.3VAC	140VDC	130VDC	-23VDC	-4.6VDC 0V	0V	0V	TOP CAP *
V 18	6W4GT	0V	0V	520VDC	500VDC	345VDC	0V	¶	¶	
V 19	1X2A	* DO NOT MEASURE								
V 20	5U4G	¶	370VDC	0V	350VAC	0V	350VAC	¶	370VDC	
V 21	16KP4	0V	9VDC	PIN 10 350VDC	PIN 11 110VDC	PIN 12 6.3VAC				

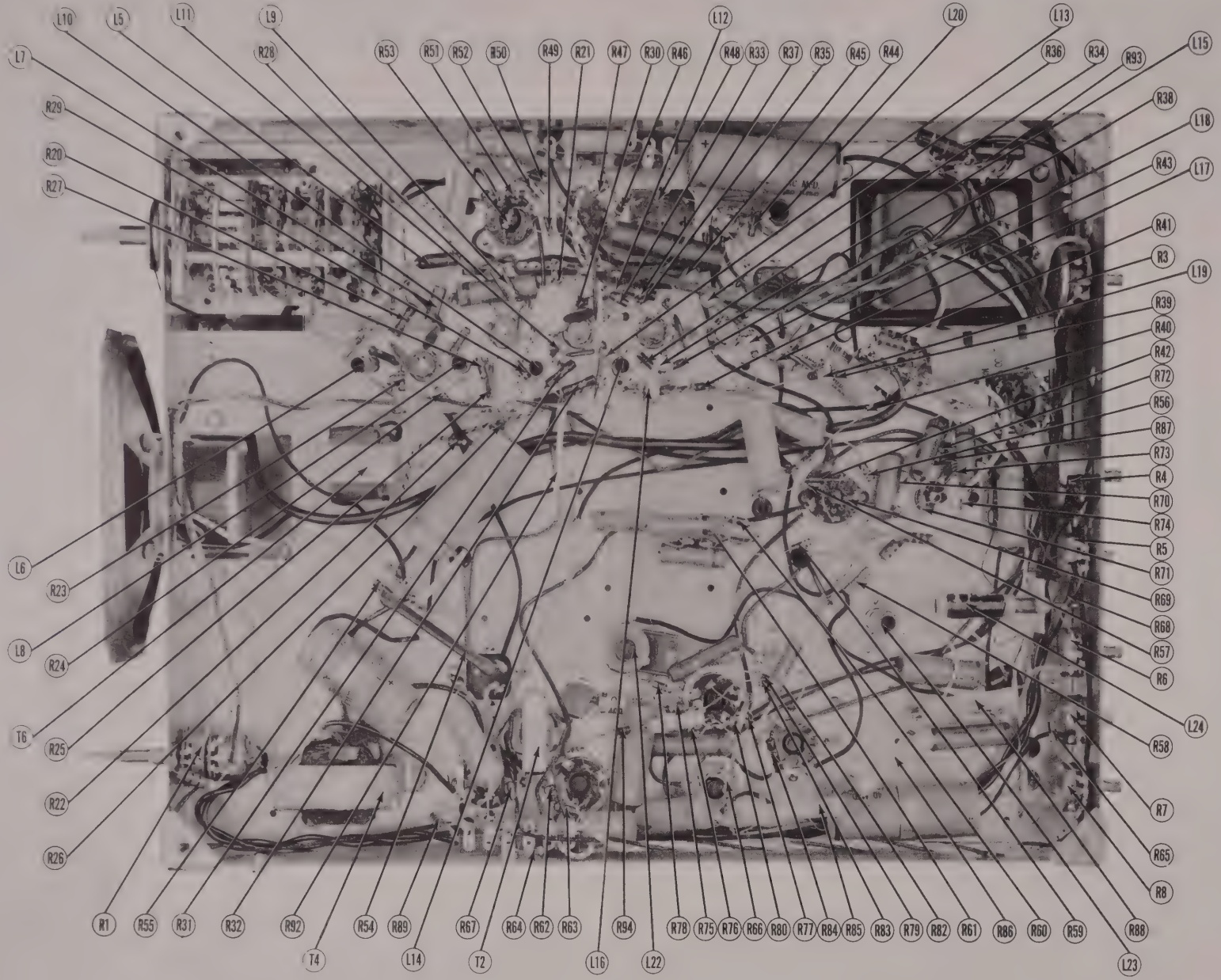
CENTERING CONTROLS AT MID-POSITION
§ TAKEN WITH VACUUM TUBE VOLTMETER
# MEASURED FROM PIN 8 OF V11
¶ 6.3VAC MEASURED ACROSS FILAMENTS

RESISTANCE READINGS

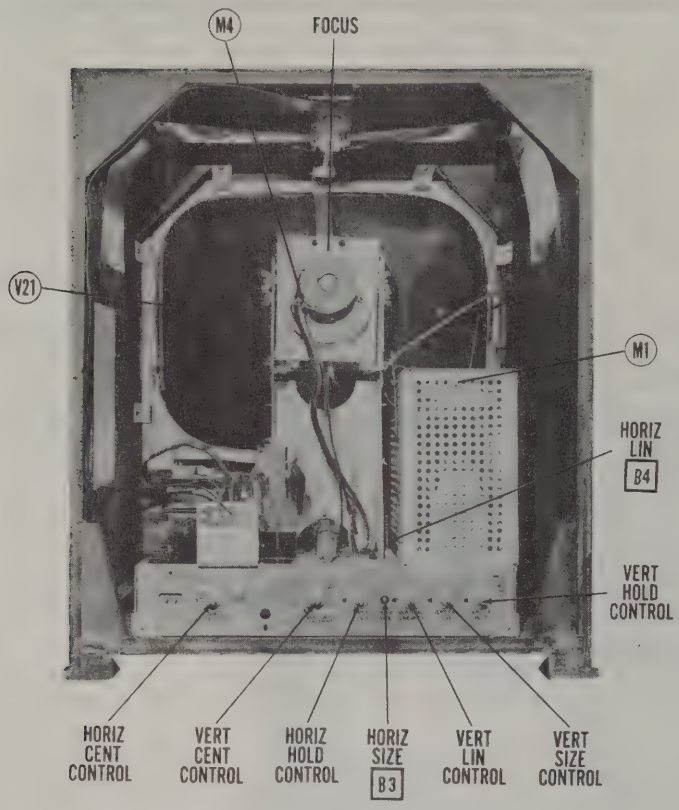
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	440KΩ	0Ω	.1Ω	0Ω	†14KΩ	†37KΩ	0Ω		
V 2	6AG5	1.1Meg	0Ω	0Ω	.1Ω	†5KΩ	†85KΩ	0Ω		
V 3	6C4	†12KΩ	Inf.	0Ω	.1Ω	†12KΩ	22KΩ	470Ω		
V 4	6AG5	440KΩ	0Ω	.8Ω	0Ω	#1KΩ	#1KΩ	0Ω		
V 5	6AG5	900KΩ	100Ω	.8Ω	0Ω	#1KΩ	#1KΩ	100Ω		
V 6	6AG5	3.8Ω	100Ω	.8Ω	0Ω	†4.8KΩ	#1KΩ	100Ω		
V 7	6AL5	8.2KΩ	330KΩ	1.3Ω	0Ω	#5.5KΩ	0Ω	.2Ω		
V 8	6CB6	8.3KΩ	#6.5KΩ	.1Ω	0Ω	†8.5KΩ	#0Ω	#6.5KΩ		
V 9	6AU6	#1Ω	#0Ω	#0Ω	#.2Ω	†33KΩ	†33KΩ	#270Ω		
V 10	6T8	Inf.	#13KΩ	Inf.	#.2Ω	#0Ω	#0Ω	#0Ω	#10Meg	†220KΩ
V 11	6K6GT	0Ω	#.2Ω	†555Ω	†120Ω	370KΩ	120KΩ	#0Ω	6KΩ	
V 12	12AU7	#820KΩ	150Ω	270KΩ	0Ω	0Ω	#8.2KΩ	#820KΩ	7KΩ	.1Ω
V 13	6K6GT	0Ω	0Ω	†520KΩ †770KΩ	†520KΩ †770KΩ	2Meg 4Meg	2Meg 0Ω	.1Ω	0Ω	
V 14	6K6GT	†100Ω	.1Ω	†1.2KΩ	†1.2KΩ	4.7Meg	Inf.	0Ω	7.2KΩ 2.2KΩ	
V 15	6AL5	27KΩ	27KΩ	.1Ω	0Ω	1Meg	0Ω	1Meg		
V 16	6SN7GT	470KΩ	†5.7KΩ	1.5KΩ	100KΩ 150KΩ	†260KΩ	1.5KΩ	.1Ω	0Ω	
V 17	6BQ6GT	#0Ω	.1Ω	†66KΩ	†67KΩ	470KΩ	50KΩ 0Ω	0Ω	0Ω	TOP CAP †22KΩ
V 18	6W4GT	Inf.	Inf.	†22KΩ	†70KΩ	†120Ω	Inf.	Inf.	Inf.	
V 19	1X2A	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP †22KΩ
V 20	5U4G	Inf.	50KΩ	Inf.	40Ω	Inf.	40Ω	Inf.	50KΩ	
V 21	16KP4	0Ω	270KΩ	PIN 10 †100Ω	PIN 11 250KΩ	PIN 12 .1Ω				

CENTERING CONTROL SET AT MID-POSITION
MEASURED FROM PIN 8 OF V11
† MEASURED FROM PIN 2 OF V20

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Connect a VTVM between the end of the green wire twisted around the focus coil leads and chassis.

Adjust the horizontal drive trimmer (B2) clockwise until the picture starts squeezing together in the center and note the VTVM reading. Then turn B2 counter-clockwise until the VTVM reading decreases 2 volts, at this point the reading should be 20 to 28 volts.

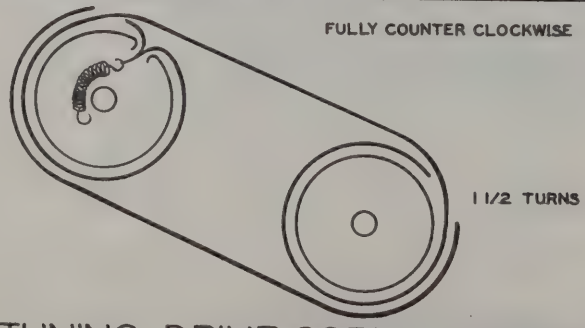
Adjust the horizontal size slug (B3) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug (B4) until the picture is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove nine wood screws holding rear cover in place. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove six bolts holding chassis in cabinet. Remove chassis.

NOTE: FOR PICTURE TUBE REMOVAL, IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.



FINE TUNING DRIVE CORD STRINGING

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amp.		6AG5	7BD	
B	RF Amp.		6CB6	6CK	
C	RF Amp.		6BC5	7BD	
V2A	Mixer		6AG5	7BD	
B	Mixer		6CB6	6CK	
C	Mixer		6BC5	7BD	
V3	Oscillator		6C4	6BG	
V4	1st Video IF Amp.		6AG5	TBD	
V5	2nd Video IF Amp.		6AG5	TBD	
V6	3rd Video IF Amp.		6AG5	TBD	
V7	Video Det., AVC		6AL5	6BT	
V8	Video Amp.		6CB6	6CK	
V9	Sound IF Amp.		6AU6	7BK	
V10	Ratio Det., AF Amp.		6T8	9E	
V11	Audio Output		6K8GT	7S	
V12	Sync. Sep., Sync. Phase Inv., DC Restorer		12AU7	9A	
V13	Vert. Oscillator		6K8GT	7S	
V14A	Vert. Output		6K8GT	7S	
B	Vert. Amp.		6B4	8AC	
V15	Horiz. Phase Det.		6AL5	6BT	
V16	Horiz. Mult.		6SN7GT	6BD	
V17	Horiz. Output		6BQ6GT	5BT	
V18	Damper		5W4GT	4CG	
V19	H.V. Rectifier		1X2A	7CM	
V20	LV Rectifier		5U4G	5T	
V21A	Picture Tube		6BP4	12D	
B	Picture Tube		6BP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	60	450	25E36	AFH128J		UPT6450		TVL-2770	▲ Filter
B	40	450							▲ Filter
C2	1000	3	25E50	PRS6-1000		BRH610		TVA-1104	Vert. Cent. Cont. Bypass
C3	1000	6	25E52	PRS6-1000		BRH610		TVA-1104	Hor. Cent. Cont. Bypass
C4	40	450	25E47	PRS4-40		BR4045A		TVA-1712	Filter
C5	40	450	25E47	PRS4-40		BR4045A		TVA-1712	Filter
C6A	40	450	25E44	AFH8J3D26B		UPT3500		TVL-3706	▲ Decoupling
B	50	150							■ Filter
C	100	50							▲ Vert. Output Cath.
C7	100	10	25E12	PRS15-100		BRH12A		TVA-1130	V Amp. Cathode
C8	10	25	25E8	PRS25-10		BR102A		TVA-1204	Stabilizing Cap.
C9	25			8125	D6-250		GP1K-25	19C27	RF Coupling
C10	680			5E680	D6-681		GP2K-680	19C17	AGC Filter
C11	680			5E680	D6-681		GP2K-680	19C17	RF Amp. Screen
C12	680			5E680	D6-681		GP2K-680	19C17	RF Amp. Filter
C13	25			8125	D6-250		GP1K-25	19C27	RF Coupling
C14	25								RF Coupling
C15	5				TCZ-5				RF Coupling
C16	1.5			SIL-5NPO	TCZ-1.5		NPOK-1.5		RF Coupling
C17	15			SL5	D6-150		GP1K-15	19C22	RF Coupling
C18	5000			BPD-005	DD-502		811-005	29C1	Mixer Screen
C19	1.5			SIL-5NPO	TCZ-1.5		NPOK-1.5		Osc. Coupling
C20	680			SI680	D6-681		GP2K-680	19C17	Osc. Feedback
C21	3						N150K-3		Fixed Trimmer
C22	680			SI680	D6-681		GP2K-680	19C17	Osc. Fil. Bypass
C23	680			SI680	D6-681		GP2K-680	19C17	RF Bypass
C24	680			SI680	D6-681		GP2K-680	19C17	RF Bypass
C25	100		23E2027-2	SI100	D6-101	5W5T1	GP1K-100	19C11	IF Coupling
C25A	4000		23E2037	BPD-3-004	DD-3-502	1DSD4	822-2X004	36C2	Mixer Plate Dec.
B	4000					1DSD4			1st V. IF Dec.
C27	5000		23E2025	BPD-005	DD-502	1DSD5	811-005	29C1	1st V. IF Fil.
C28	5000		23E2025	BPD-005	DD-502	1DSD5	811-005	29C1	AGC Filter
C29	100		23E2027-2	SI100	D6-101	5W5T1	GP1K-100	19C11	IF Coupling
C30	5000		23E2025	BPD-005	DD-502	1DSD5	811-005	29C1	AGC Filter
C31	1.0	200	23E226	684-1.0		GT2W1		2TM-M1	AGC Filter
C32A	4000		23E2037	BPD-2X004	DD-2-502	1DSD4	822-2X004	36C2	2nd V. IF Dec.
B	4000					1DSD4			2nd V. IF Fil.
C33	100		23E2027-2	SI100	D6-101	5W5T1	GP1K-100	19C11	IF Coupling
C34A	4000		23E2037	BPD-2X004	DD-2-502	1DSD4	822-2X004	36C2	3rd V. IF Plate Dec.
B	4000					1DSD4			3rd V. IF Screen
C35A	4000		23E2037	BPD-2X004	DD-2-502	1DSD4	822-2X004	36C2	3rd V. IF Cathode
B	4000					1DSD4			3rd V. IF Fil.
C36	100		23E2027-2	SI100	D6-101	5W5T1	GP1K-100	19C11	IF Coupling
C37	10		23E25	SI10	D6-100	5W5Q1	GP1K-10	19C19	IF Coupling
C38A	4000		23E2037	BPD-2X004	DD-2-502	1DSD4	822-2X004	36C2	DAGC Dec.
B	4000					1DSD4			V. Det.-AGC Fil.
C39	5		23E28	SI5NPO	TCZ-4.7	5W5V5	NPOK-5	MS-55	V. Diode Filter
C40	.1	400	23E48	P488-1	DF-104	PTE4P1		4TM-P1	Video Coupling
C41	.05	200	23E216	P288-05	DF-503	PTE485		2TM-S5	Picture Tube Cathode
C42	2		23E21		TCZ-2.2				S. IF Coupling
C43	3		23E13				N750K-3		Fixed Trimmer
C44A	4000		23E2037	BPD-2X004	DD-3-502	1DSD4	822-2X004	36C2	S. IF Dec.
B	4000					1DSD4			S. IF Cathode
C45	4000		23E2032	SI1000	D6-102	1W5D1	GP2L-001	19C1	Diode Load Cap.
C46	.003	600	23E205	P688-003	D6-303	PTE6D2	GP2M-002	6TM-D2	De-emphasis
C47	.25	400	23E25	P488-05	DF-503	PTE485		4TM-S5	Audio Coupling
C48	.005	600	23E208	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Audio Coupling
C49	1000		23E2032	SI1000	D6-102	1W5D1	GP2L-001	19C1	RF Bypass
C50	5000		23E2025	BPD-005	DD-502	1DSD5	811-005	29C1	RF Bypass
C51	.05	400	23E216	P488-05	DF-503	PTE485		4TM-S5	RF Bypass
C52	.02	400	23E43	P488-02	DF-203	PTE482		4TM-S2	Audio Coupling
C53	.05	400	23E216	P488-05	DF-503	PTE485		4TM-S5	Bias Filter
C54	.005	600	23E208	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Output Plate
C55	.003	600	23E205	P688-003	D6-303	PTE6D2	GP2M-003	6TM-D2	Integrator Net

CAPACITORS (CONT.)

ITEM No.	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C56	.005	600	23E208	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Integrator Net
C57	.005	600	23E208	P688-006	D6-502	PTE6D5	811-006	6TM-D5	Integrator Net
C58	.005	200	23E208	P688-005	D6-502	PTE6D5	811-006	6TM-D5	Vert. Osc. Grid.
C59	.05	600	23E216	P688-05		PTE6S5		6TM-S5	Vert. Discharge *
C60	.1	600	23E618	P688-1	DF-104	PTE6P1		6TM-P1	Vert. Sweep Coupling
C61	.1	600	23E618	P688-1	DF-104	PTE6P1		6TM-P1	Decoupling †
C62	1000		23E2012	SI1000	D6-102	1W5D1	GP2L-001	19C1	Hor. Sync. Coupling
C63	1000		23E2012	SI1000	D6-102	1W5D1	GP2L-001	19C1	Hor. Sync. Coupling
C64	.003	200	23E206	P688-003	D6-302	PTE6D3	GP2M-003	6TM-D3	Voltage Divider
C65	.05	600	23E616	P688-05	DF-503	PTE6S5		6TM-S5	Hor. Feedback
C66	.02	400	23E213	P488-02	DF-203	PTE482		4TM-S2	AFC Filter
C67	.02	400	23E213	P488-02	DF-203	PTE482		4TM-S2	AFC Filter
C68	.01	400	23E211	P488-01	D6-103	PTE481	821-01	4TM-S1	AFC Filter
C69	.25	200	23E222	P488-25		GT2P25		2TM-P25	AFC Filter
C70	400		23E2030-4	1468-0004	D6-391	5W5T4	GP2K-390	1FM-34	Hor. MV Feedback
C71	4000	500	23E86	1468-004		1DR5D4		M8-24	Fixed Trimmer
C72	500		23E2030-9	1469-0005	D6-501	5R5T5	GP2K-500	M8-35	Horiz. Discharge
C73	250		23E2030-3	1468-00025	D6-251	5W5T25	GP2K-250	1FM-325	Horiz. Sweep Coupling
C74	.05	400	23E416	P488-05	DF-503	PTE485		4TM-S5	Horiz. Output Screen
C75	.05	400	23E416	P488-05	DF-503	PTE485		4TM-S5	Damper Filter
C76	.1	400	23E418	P488-1		PTE4P1		4TM-P1	Damper Filter
C77	.03	400	23E414	P688-03		PTE6S3		6TM-S3	Fixed Trimmer
C78	500	20000	23E2039	HV20C	TV3-502			H.V. Filter	
C79	.01	400	23E035-3	P488-01	D6-103	PTE481	821-01	4TM-S1	Line Filter
C80	.01	400	23E035-3	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Line Filter

* Models Using A 6S4 Vert. Amp. (V13) Use .1MFD In This Application. Migrs. Part # 23E618

† Used Only In Models Using A 6K6 Vert. Amplifier.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	INSTALLATION NOTES
R1A	35KΩ	½	28E64		RTV-213	SBB-602-S	Brightness control - panel
B	500KΩ	½					Volume control and SW - rear
R2A	1000Ω	½	28E65	QII-108	AM-8-S	B-5	Contrast control
B	Shaft		Not req.	Not req.	RS-2	Not req.	Attach to R2A per instructions
R3	60Ω	2	28E54	W-60	43-60	VK-117	Horiz. centering control - wire wound
R4	300	2	28E68	W-30X10	RTV-3	SVT-901	Vert. centering control - wire wound - tapped ④ 10Ω
R5A	50KΩ	½	28E43	QII-123	AG-44-S	AN-31	Horizontal hold control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R5A per instructions
R6A	5000Ω	½	28E44 *	QII-114	AG-19-S	AN-10	Vert. linearity control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R6A per instructions
R7A	1Meg	½	28E36	QII-137	AG-61-S	AN-89	Vertical size control.
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R7A per instructions
R8A	2Meg	½	28E72	QII-139	AG-83-S	AN-75	Vertical hold control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R8A per instructions

* Models employing a 6K6 vert. amplifier tube use control with part # 28E67 in this application.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R9	1000Ω	½			RF Amp. Grid
R10	33KΩ	½			RF Amp. Screen
R11	10KΩ	1			RF Amp. Plate
R12	18KΩ	½			Coil Shunt
R13	4700Ω	½			Coil Shunt
R14	82KΩ	½			Converter Grid
R15	1Meg	½			Converter Grid
R16	82KΩ	½			Converter Screen
R17	22KΩ	½			Osc. Grid
R18	470Ω	½			Osc. Cathode
R19	68000Ω	1			Osc. Plate
R20	1000Ω	½	27E102-2	BTS-1000	Converter Decoup
R21	1000Ω	½	27E102-2	BTS-1000	AGC Network
R22	330Ω	½	27E331-2	BTS-330	AGC Network
R23	68000Ω 5%	½	27E1009-13		1st Video IF Amp. Grid
R24	1000Ω	½	27E105-2	BTS-1000	1st Video IF Amp. Decoup
R25	2.2Meg	½	27E225-2	BTS-2.2Meg	AGC Network
R26	1Meg	½	27E105-2	BTS-1Meg	AGC Network
R27	68000Ω 5%	½	27E1009-13		2nd Video IF Amp. Grid
R28	100Ω	½	27E101-2		2nd Video IF Amp. Cathode
R29	1000Ω	½	27E102-2	BTS-1000	2nd Video IF Amp. Decoup
R30	100Ω	½	27E101-2		3rd Video IF Amp. Cathode
R31	1000Ω	½	27E102-2		3rd Video IF Amp. Screen
R32	1000Ω	½	27E102-2	BTS-1000	3rd Video IF Amp. Plate Decoup
R33	220KΩ	½	27E224-2	BTS-220K	AGC Network *
R34	8200Ω 5%	½	27E1009-15	BTS-8200-5%	Video Det. Diode Load
R35	330KΩ	½	27E334-2	BTS-330K	AGC Diode Load
R36	39KΩ	1	27E393-3	BTA-39K	AGC Network
R37	2.2Ω	½	27E1015-2	BW-½-2.2	Video Det. Filament - Wire Wound
R38	100Ω	½	27E101-2		Parasitic Suppressor
R39	330Ω	½	27E331-2	BTS-330	Video Amp. Cathode
R40	10KΩ	½	27E103-2	BTS-10K	Decoup
R41	15KΩ	2	27E153-5	BTB-15K	Decoup - See Note 1
R42	2200Ω	½	27E222-2	BTS-2200	Picture Tube Grid
R43	220KΩ	½	27E224-2	BTS-220K	Picture Tube Cathode
R44	270Ω	½	27E271-2		Sound IF Amp. Cathode
R45	33KΩ	1	27E333-3	BTA-33K	Sound IF Amp. Decoup
R46	6800Ω	½	27E682-2	BTS-6800	Ratio Det. Diode Load
R47	6800Ω	½	27E682-2	BTS-6800	Ratio Det. Diode Load
R48	39KΩ	½	27E393-2	BTS-39K	De-emphasis
R49	10Meg	½	27E106-2	BTS-10Meg	AF Amp. Grid
R50	220KΩ	½	27E224-2	BTS-220K	AF Amp. Plate
R51	330KΩ	½	27E334-2	BTS-330K	Voltage Divider
R52	220KΩ	½	27E224-2	BTS-220K	Output Grid

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R53	150KΩ 5%	1	27E2009-12	BTS 150K-5%	Output Grid
R54	6000Ω	5	27E1016-5	1 3/4A-6000	Voltage Divider - Wire Wound
R55	150Ω	½	27E151-2	BTS-150	Sync. Separator Grid
R56	270KΩ	½	27E274-2	BTS-270K	Sync. Separator Plate
R57	820KΩ	½	27E824-2	BTS-820K	Sync. Separator Plate
R58	8200Ω	½	27E822-2	BTS-8200	Sync. Phase Inverter Plate
R59	22KΩ	½	27E223-2	BTS-22K	Integrator
R60	8200Ω	½	27E822-2	BTS-8200	Integrator
R61	8200Ω	½	27E822-2	BTS-8200	Integrator
R62	2Meg	½		BTS-2.2Meg	Vert. Osc. Grid - See Note 1 and 2
R63	470KΩ	½	27E474-2	BTS-470K	Vert. Osc. Plate
R64	6800Ω	½	27E682-2	BTS-6800	Vert. Peaking - See Note 3
R65	100KΩ 5%	½	27E104-2	BTS-100K-5%	Voltage Divider - See Note 6
R66	47KΩ	½	27E473-2	BTS-47K	Voltage Divider - See Note 6
R67	4.7Meg	½	27E475-2	BTS-4.7Meg	Vert. Amp. Grid - See Note 4
R68	2200Ω	½	27E222-2	BTS-2200	Vert. Amp. Cathode - See Note 5
R69	6800Ω	½	27E682-2	BTS-6800	Bias Network
R70	27KΩ	½	27E273-2	BTS-27K	Horiz. Phase Det. Diode Load
R71	33KΩ	½	27E333-2	BTS-33K	Horiz. Phase Det. Diode Load
R72	470KΩ	½	27E474-2	BTS-470K	Horiz. Phase Det. Diode Load
R73	470KΩ	½	27E474-2	BTS-470K	Horiz. Phase Det. Diode Load
R74	33KΩ	½	27E333-2	BTS-33K	Horiz. Phase Det. Diode Load
R75	33KΩ	½	27E333-2	BTS-33K	Horiz. AFC Filter
R76	470KΩ	½	27E474-2	BTS-470K	Horiz. MV Grid
R77	1500Ω	½	27E152-2	BTS-1500	Horiz. MV Cathode
R78	5600Ω 5%	½	27E1009-8	BTS-5600-5%	Horiz. MV Plate
R79	100KΩ	½	27E104-2	BTS-100K	Horiz. MV Grid
R80	250KΩ	1	27E254-3	BTA-250K	Horiz. MV Plate - See Note 7
R81	470KΩ	½	27E474-2	BTS-470K	Horiz. MV Plate - See Note 8
R82	100Ω	½	27E101-2		Parasitic Suppressor
R83	470KΩ	½	27E474-2	BTS-470K	Horiz. Output Grid
R84	100Ω	½			Parasitic Suppressor - See Note 8
R85	22KΩ	4	27E1016-15		Horiz. Output Screen Decoup - Wire Wound
R86	22KΩ	½	27E1016-15	BW-½-22K	Horiz. Output Screen Decoup - Wire Wound
R87	4700Ω	½	27E472-2		Horiz. Output Feedback
R88	22KΩ	4	27E1016-15		Voltage Divider - Wire Wound - See Note 9
R89	68KΩ	1	27E683-3	BTA-68K	Voltage Divider
R90	3.3Ω	½	27E1015-4		HV Rectifier Filament
R91	1.2Meg	½	27E1009-5		HV Filter
R92	4000Ω	5	27E1016-14	1 3/4A-4000	Filter - Wire Wound
R93	330KΩ	½	27E334-2	BTS-330K	Isolation

Note 1. Some Models Use Series Resistor In This Application.
Note 2. Some Models Use 1Meg Resistance In This Application.
Note 3. When 6S4 Vert. Amplifier Tube Is Used, This Value Is 2700Ω.
Note 4. When 6S4 Vert. Amplifier Tube Is Used, This Value Is 1Meg.
Note 5. When 6S4 Vert. Amplifier Tube Is Used, This Value Is 680Ω.
Note 6. Used Only When 6K6 Vert. Amplifier Tube Is Used.
Note 7. Some Models Use 470KΩ Resistor In This Application.
Note 8. Not Used In All Models.
Note 9. Some Models Use 47KΩ 2 Watt Resistor In This Application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC ④ 1.7A	700VCT .200ADC	5V ④ 3A SEC. 4 6.3V ④ 6.A	6.3V ④ 1.2A SEC. 5 6.3 V ④ 1.2A	22E43		P3061 ① P3074 ②	TP-405 ① FO-615 ②

① Drill new mounting holes.
② Mount beneath chassis.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	NOTES
T2	185Ω	975Ω	22E55	A-8111 ③	A-3000 ③	TBO-1 ③	Vert. Block
T3	315Ω Tapped ④ 22Ω	8.5Ω Tapped ④ .5Ω & 6.8Ω SEC. 2 0Ω	22E81		HVO-6		Horiz. Output
T4	1100Ω Tapped ④ 1.8Ω		22E51	A-8123	A-3037		Vert. Output
T5A	13Ω		30E164	DY-7	MD-70		Horiz. Deflection Coil
B	62Ω						Vert. Deflection Coil

③ Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	INSTALLATION NOTES
T6	6.4KΩ	4.2Ω	435Ω	.7Ω	22E35-2	A3878	A-2931	R0-13	

PARTS LIST CONTINUED ON PAGE 15

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	SENTINEL PART No.	JENSEN PART No.	QUAM PART No.	
SP1A	100Ω	4.2Ω	1E39 ④		46E90S	④ Used In Model 420B
B	PM	4.2Ω	1E43 ⑤	10J12	10A4A	⑤ Used In Model 423
C	PM	4.2Ω	1E48 ⑥	12J12	12A4	⑥ Used In Model 424
	CONE DIA.	V. C. DIA.				
SP2A	4X6	9/16				
B	10"					
C	12"					

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	SENTINEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.200A	100Ω		22E52				Used In Models 423, 424

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	SENTINEL PART No.	MEISSNER PART No.	IRC PART No.	
L2	Antenna Trap	.1Ω	.1Ω				Part of tuner part #20E519
L3	Fil. Choke	.1Ω					Part of tuner part # 20E519
L4	Fil. Choke	.1Ω					Part of tuner part #20E519
L5	Fil. Choke	.1Ω		2E78			
L6	1st Video IF	.2Ω		20E360			
L7	Fil. Choke	1.2Ω		2E92		CLA	1.5 Microhenries
L8	2nd Video IF	.2Ω		20E360			
L9	Fil. Choke	1.2Ω		2E92		CLA	1.5 Microhenries
L10	3rd Video IF	.2Ω		20E360			
L11	Grid Choke	3.8Ω		20E363-9			Wound on 4.7KΩ resistor
L12	Fil. Choke	1.2Ω		2E92		CLA	1.5 Microhenries
L13	RF Choke	3.8Ω		20E363-8			Wound on 10Meg resistor
L14	4th Video IF	.2Ω		20E360			
L15	Peaking	8.8Ω		20E363-2			Wound on 33KΩ resistor
L16	Peaking	27Ω		20E363-6			Wound on 1Meg resistor
L17	RF Choke	1.2Ω		2E92		CLA	1.5 Microhenries
L18	Peaking	14Ω		20E363-3			Wound on 15KΩ resistor
L19	Peaking	18Ω		20E363-10			Wound on 10Meg resistor
L20	Sound IF	2.9Ω		20E361			
L21	Ratio Det. Trans.	3.8Ω	.6Ω	20E537			
L22	Horiz. Freq.	63Ω		20E409			
L23	Horiz. Lin.	15Ω		20E524			
L24	Horiz. Size	.2Ω		20E639			

FUSES

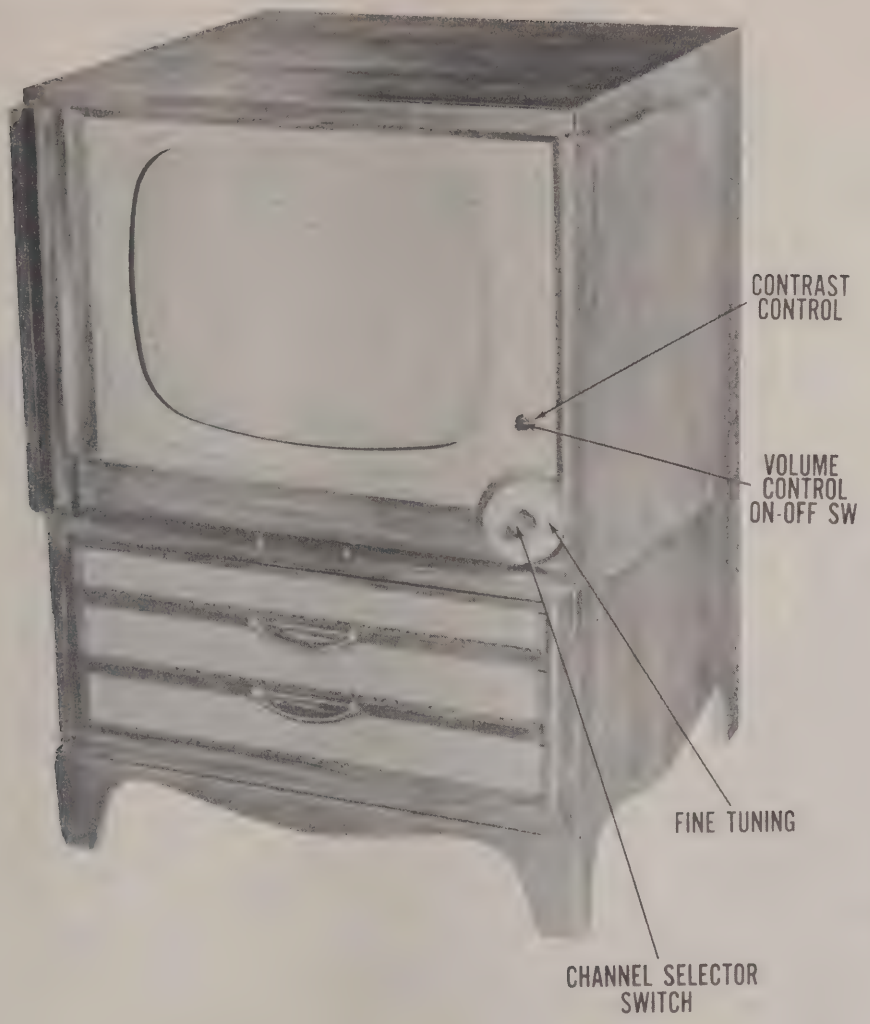
ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			SENTINEL PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG	1/4A	40E8-2	357001	312.250	357001	

MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
M2	RF Tuner	20E519	
M3	Focus Magnet	62E2	
M4A	Ion Trap	15E174-4-24	For 16KP4 Picture Tube
B	Ion Trap	15E174-4	For 16RP4 Picture Tube
B2	Trimmer	24E16	340-460MMF Horizontal Drive
	Safety Glass	9E34	Model 420B Mahogany
	Safety Glass	9E39	Model 423 Mahogany
	Safety Glass	9E39-2	Model 423 Blonde
	Safety Glass	9E36	Model 424
	Metal Plate	36E57-2	Channel Selector
	Metal Plate	36E58-2	Volume
	Knob	37E59-6	Channel Selector, Less Metal Plate Models 420B, 423, 424 Mahogany
	Knob	37E59	Channel Selector, Less Metal Plate Models 423, 424 Blonde
	Knob	37E59-5	Volume, Less Metal Plate Models 420B, 423, 424 Mahogany
	Knob	37E59-11	Volume, Less Metal Plate Models 423, 424 Blonde
	Knob	37E67	Contrast Model 420B Mahogany
	Knob	37E67-7	Contrast Models 423, 424
	Knob	37E67-2	Brightness Model 420B Mahogany
	Knob	37E67-8	Brightness Models 423, 424
	Knob	37E62	Antenna Model 420B Mahogany, 424
	Knob	37E61	Antenna Model 423 Mahogany
	Knob	37E61-2	Antenna Model 423 Blonde

PHOTOFACT* Folder
*TRADE MARK

WESTINGHOUSE MODELS H-638K20 (Ch. V-2178), H-642K20 (Ch. V-2178-1, -3)



WESTINGHOUSE MODELS H-638K20 (Ch. V-2178), H-642K20 (Ch. V-2178-1, -3)

WESTINGHOUSE MODEL H-638K20

TRADE NAME	Westinghouse, Models H-638K20 (Ch. V-2178), H-642K20 (Ch. V-2178-1 or V-2178-3)
MANUFACTURER	Westinghouse Elect. Corp., Home Radio Div., Sunbury, Pa.
TYPE SET	Television Receiver
TUBES	Twenty Four
POWER SUPPLY	110-120 Volts AC - 60 Cycle
RATING	2.1 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

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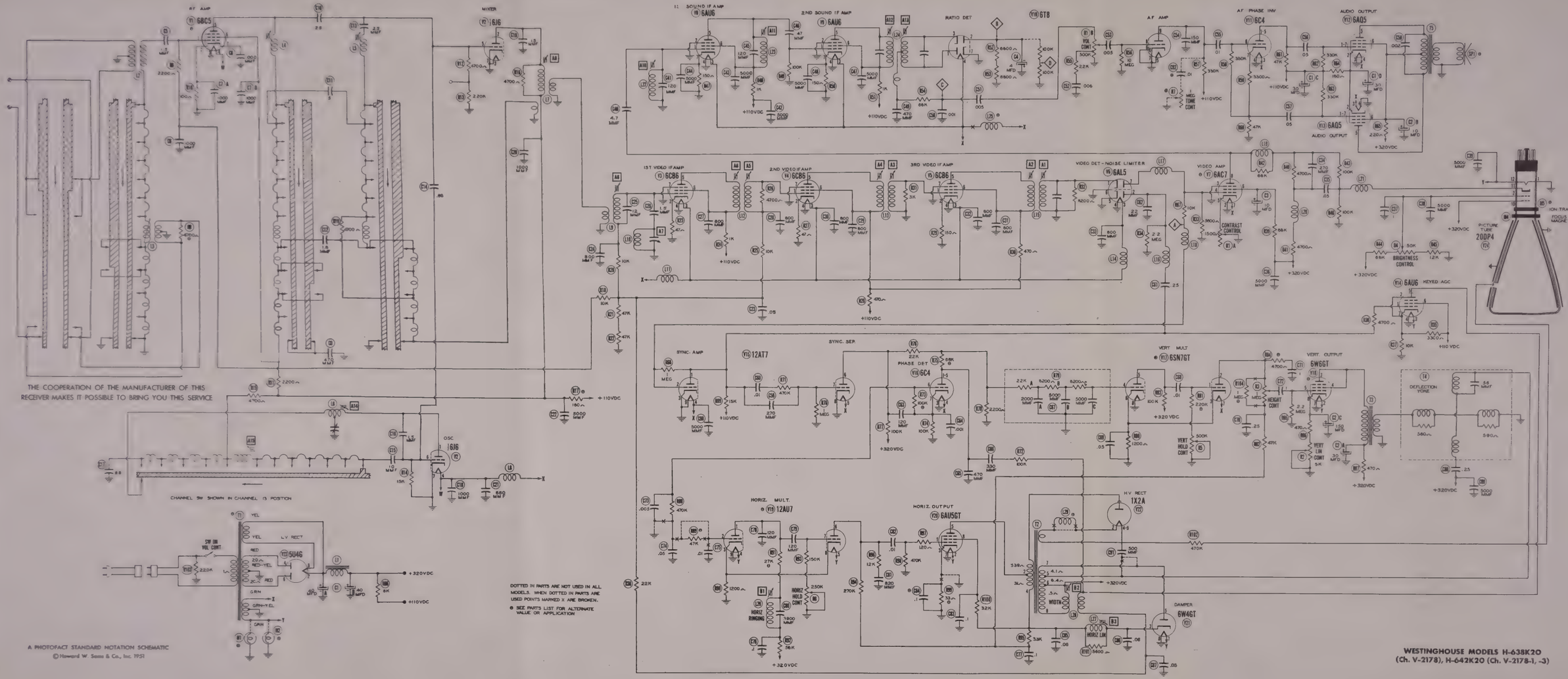
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SW SHOWN IN CHANNEL 13 POSITION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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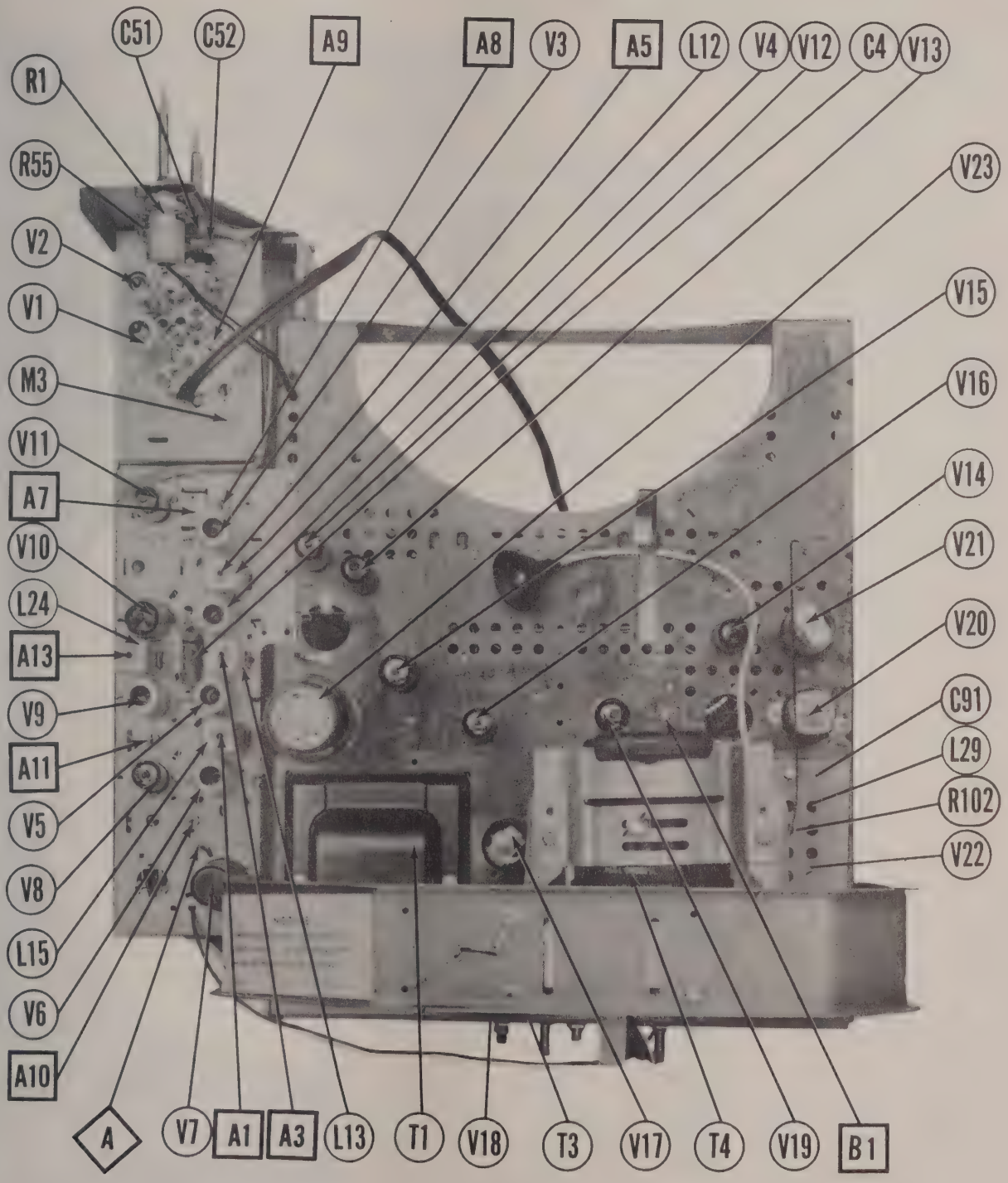
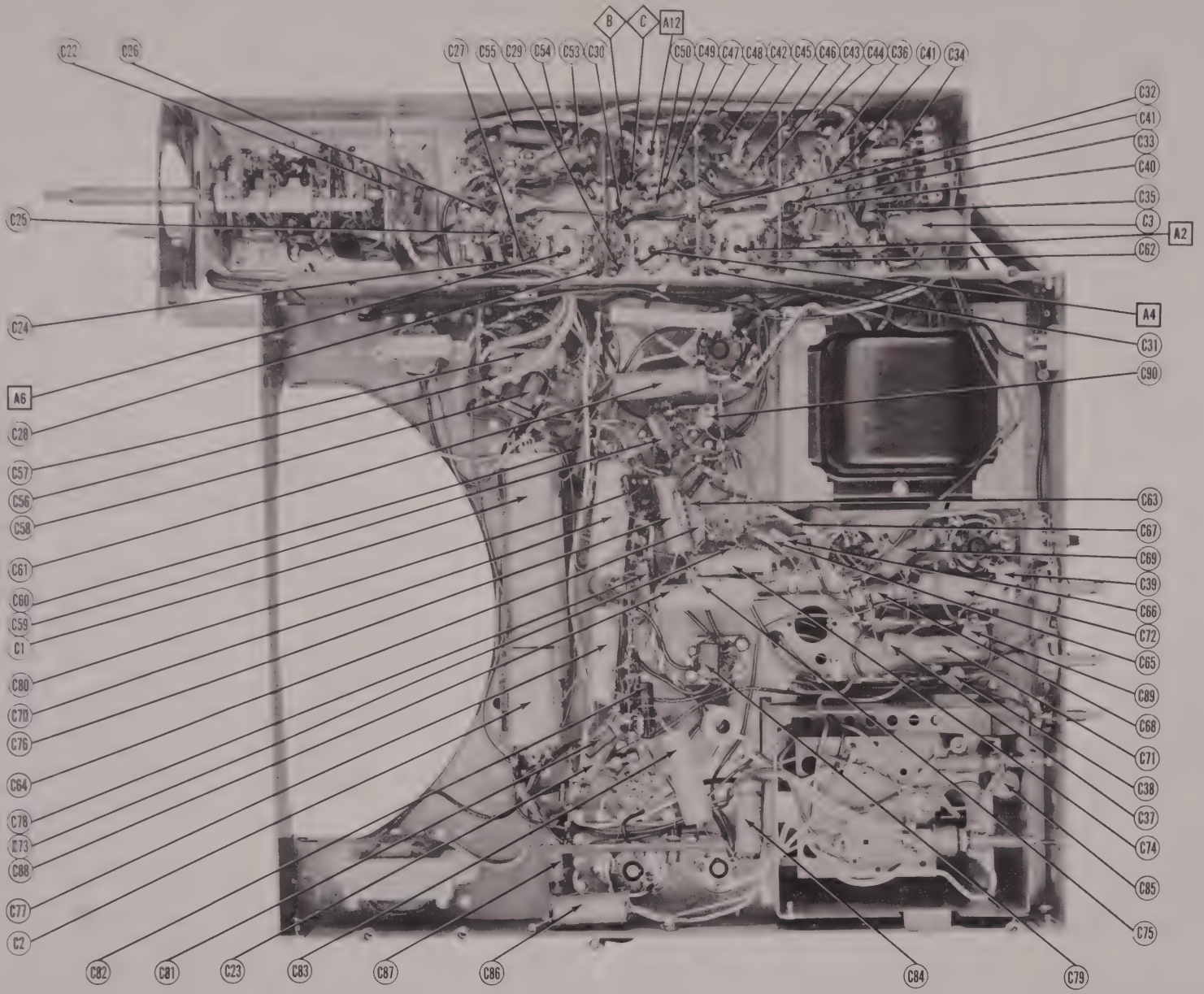
WESTINGHOUSE MODELS H-638K20
(Ch. V-2178), H-642K20 (Ch. V-2178-1, -3)

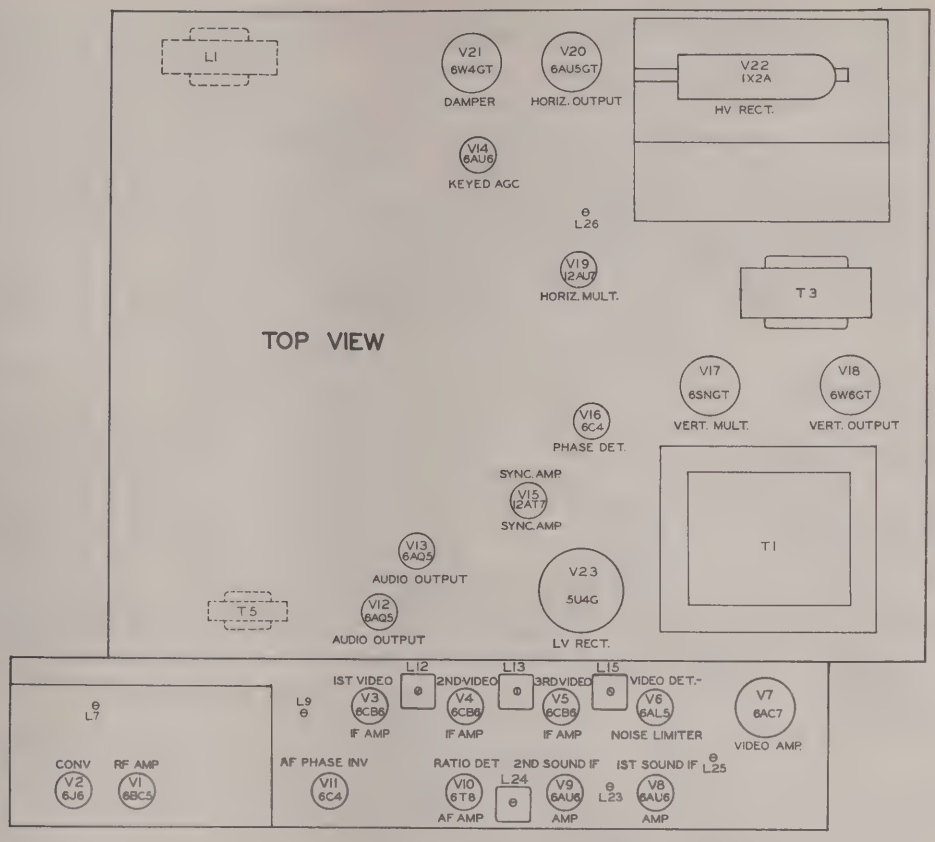
WESTINGHOUSE MODELS H-638K20
(Ch. V-2178), H-642K20 (Ch. V-2178-1, -3)

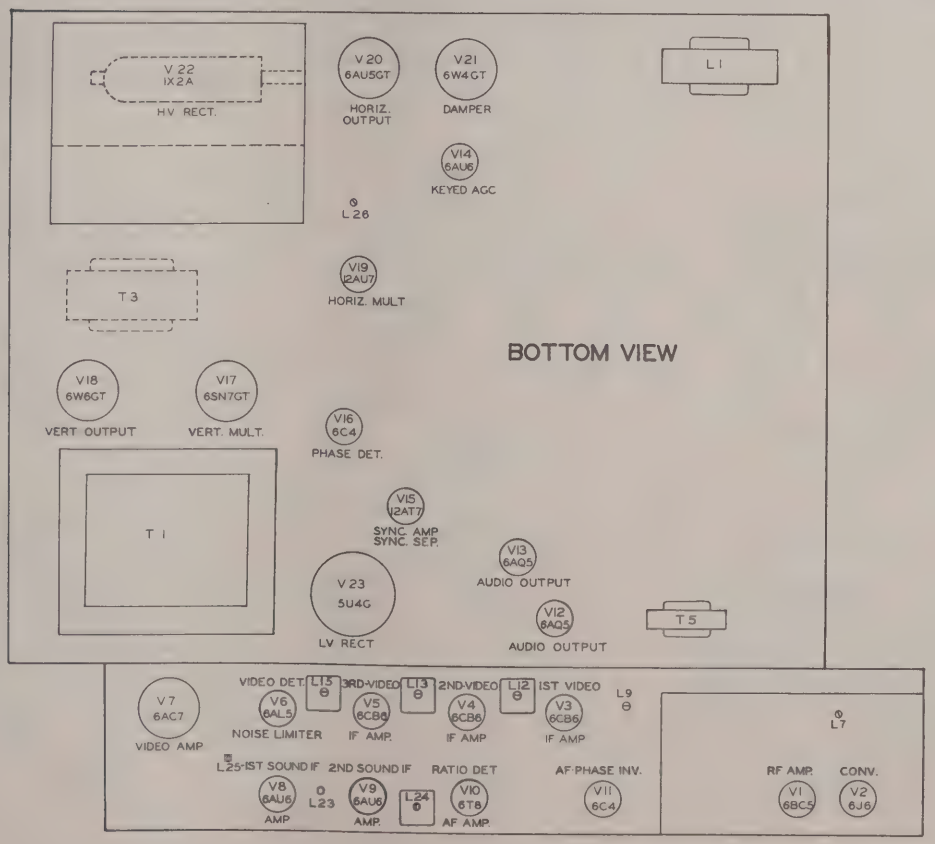


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace it with a 6J6 which has pin 1 removed. This will prevent the possibility of erroneous indications caused by the local oscillator.

Connect a 47KΩ resistor in series with the vertical input lead of the oscilloscope, and a 470MMF capacitor across the oscilloscope vertical input terminals.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

If any slug shows two peaks use the one with the slug farthest out.

The primary of the transformer feeding the grid of the stage to which the sweep generator is connected, should be detuned by clipping an alligator clip to the plate terminal of the transformer. The stray capacity thus added will sufficiently detune the transformer primary.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.005MFD	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC SWP)	42.25MC 43MC 45MC 45.75MC	Any	Vert. amp. thru 47KΩ to Point (A). Low side to chassis.	A1, A2	Adjust for response curve similar to fig. 1.
2.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	"	"	"	A3, A4	Adjust for response curve similar to fig. 2.
3.	"	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	"	"	"	"	A5, A6	Remove detuning clip and short link between L74 and L9. Adjust for response curve similar to figure 3.
4.	"	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	"	41.25MC 42.75MC 43MC 45MC 45.75MC	"	"	A7, A8, A9	Remove link short. Adjust A7 for MINIMUM marker indication at the 41.25MC point on response curve. Adjust A8 and A9 for response curve similar to figure 4.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (- 1%) resistors in series from Point B to chassis. The junction of these two resistors is alignment Point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.005MFD	High side to Point A. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to Point (B). Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
6.	"	"	"	"	DC probe to Point (C). Common to Point (D).	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.005MFD	High side to Point A. Low side to chassis.	4.5MC (Unmod.)	4.5MC	Any	Vert. amp. to Point (B). Low side to chassis.	A10, A11, A12	Disconnect stabilizer capacitor C4. Adjust for maximum amplitude and symmetry as per figure 5.
6.	"	"	"	"	"	Vert. amp. to Point (C) Low side to chassis.	A13	Reconnect capacitor C4. Adjust A13 so 4.5MC occurs at center of crossover lines as per figure 6. SLIGHTLY retouch A12 for max. amplitude and straightness of crossover lines.

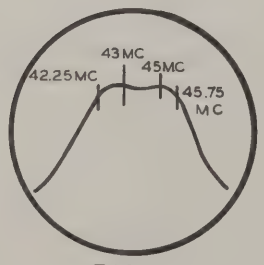


FIG.1

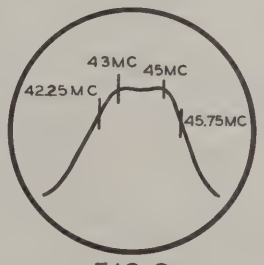


FIG.2

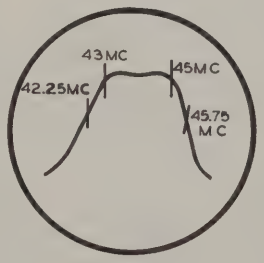


FIG.3

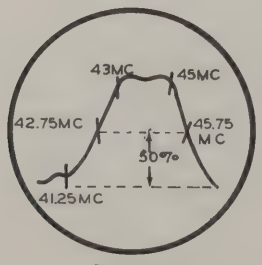


FIG.4

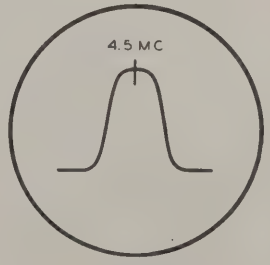


FIG. 5

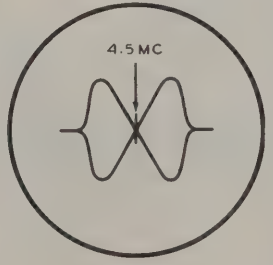


FIG.6

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. amp. to Point (A). Low side to chassis.	A14	Adjust to place the video marker at 50% response as shown in figure 7.
8.	"	"	207MC (10MC SWP)	205.25MC 209.75MC	12	"		Check to see that the video marker can be properly placed well within the range of the fine tuning control. If not compromise adjustment of A14 will be required.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
9.	"	"	85MC (10MC SWP)	83.25MC 87.75MC	6	"	A15	Adjust to place the video marker at 50% response as shown in figure 7.
10.	"	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"		Check to see that the video marker can be properly placed well within the range of the fine tuning control. If not compromise adjustment of A15 will be required.
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

THE RF PORTION OF THIS TUNER HAS BEEN PROPERLY ADJUSTED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT OF THIS PORTION SHOULD NOT BE REQUIRED IN THE FIELD.

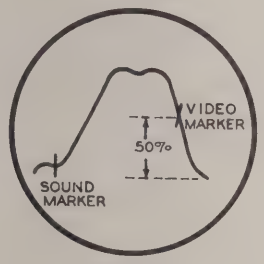


FIG.7

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB5	-.1VDC	.7VDC	0V	6.3VAC	90VDC	90VDC	.7VDC		
V 2	6J6	§5VDC	105VDC	0V	6.3VAC	-.8VDC	§-5.5VDC	0V		
V 3	6CB6	-.1VDC	-.4VDC	6.3VAC	0V	100VDC	100VDC	0V		
V 4	6CB6	-.1VDC	-.4VDC	6.3VAC	0V	100VDC	100VDC	0V		
V 5	6CB6	0V	1.4VDC	6.3VAC	0V	95VDC	95VDC	0V		
V 6	6AL5	0V	-.4VDC	6.3VAC	0V	0V	0V	-.2VDC		
V 7	6AC7	0V	0V	0V	-.2VDC	5.6VDC	235VDC	6.3VAC	275VDC	
V 8	6AU6	0V	0V	6.3VAC	0V	100VDC	100VDC	1.2VDC		
V 9	6AU6	0V	0V	6.3VAC	0V	100VDC	100VDC	1VDC		
V 10	6T8	-.6VDC	-2VDC	-.6VDC	6.3VAC	0V	0V	0V	-.9VDC	55VDC
V 11	6C4	75VDC	8.8VDC	6.3VAC	0V	75VDC	5VDC	35VDC		
V 12	6AQ5	#0V	#11VDC	0V	6.3VAC	#185VDC	#190VDC	#0V		
V 13	6AQ5	#0V	#11VDC	6.3VAC	0V	#185VDC	#190VDC	#0V		
V 14	6AU6	60VDC	85VDC	6.3VAC	0V	*	110VDC	85VDC		
V 15	12AT7	60VDC	-.2VDC	0V	6.3VAC	6.3VAC	45VDC	-.6VDC	0V	0V
V 16	6C4	1.6VDC	0V	0V	6.3VAC	1.6VDC	1.4VDC	2.5VDC		
V 17	6SN7GT	-25VDC -40VDC	155VDC 100VDC	4.3VDC	3.2VDC	45VDC	4.3VDC	6.3VAC	0V	
V 18	6W6GT	0V	6.3VAC	300VDC 230VDC	300VDC 230VDC	0V	0V	0V	50VDC 25VDC	
V 19	12AU7	90VDC	.5VDC	6VDC 5VDC	6.3VAC	6.3VAC	165VDC 145VDC	-7.6VDC -10VDC	6VDC 5VDC	0V
V 20	5AU5GT	-25VDC	6.3VAC	3VDC	0V	*	0V	0V	175VDC	
V 21	6W4GT	0V	0V	540VDC	0V	320VDC	0V	6.3VAC	0V	
V 22	1X2A	* DO NOT MEASURE								
V 23	5U4G	0V	325VDC	105VDC	315VAC	0V	315VAC	0V	325VDC	
V 24	20DP4	0V	35VDC 135VDC	PIN 10 320VDC	PIN 11 140VDC	PIN 12 6.3VAC				

§ TAKEN WITH VACUUM TUBE VOLTMETER
# MEASURED FROM 110VDC POINT
* DO NOT MEASURE

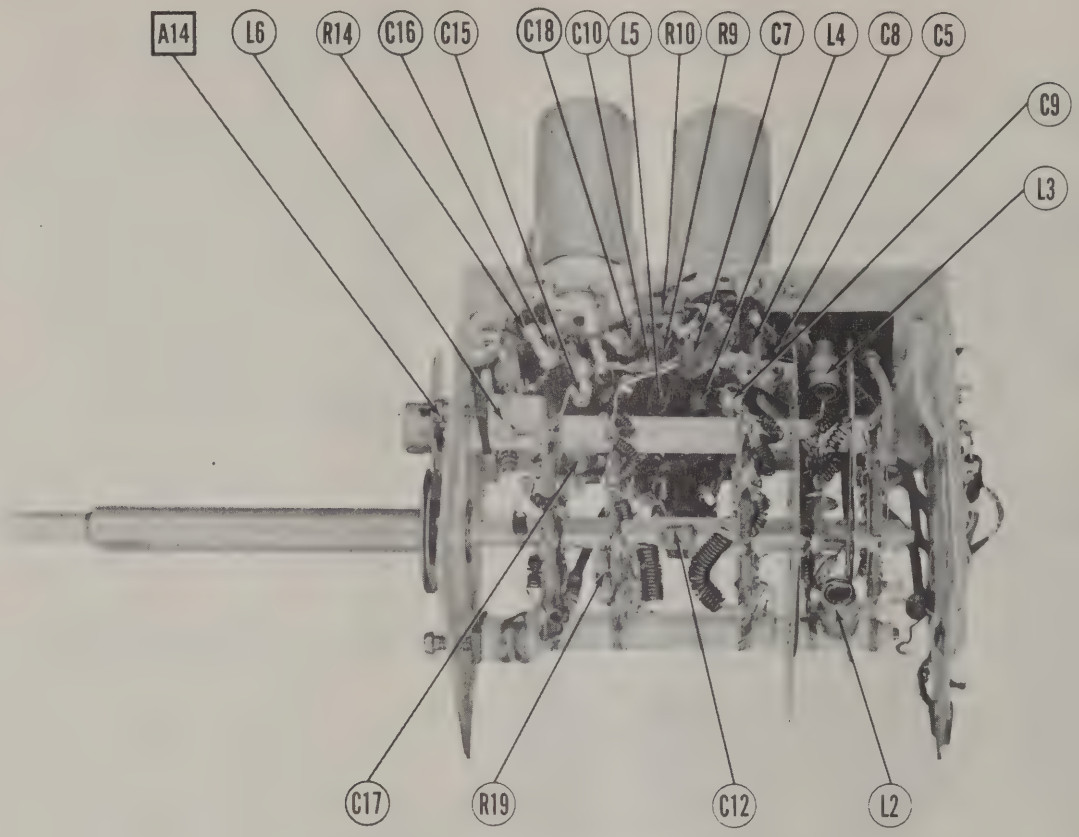
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB5	105KΩ	100Ω	0Ω	.1Ω	†10KΩ	†10KΩ	100Ω		
V 2	6J6	†15KΩ	† 8KΩ	0Ω	.1Ω	225KΩ	15KΩ	0Ω		
V 3	6CB6	105KΩ	47Ω	.1Ω	0Ω	†9KΩ	†9KΩ	0Ω		
V 4	6CB6	105KΩ	47Ω	.1Ω	0Ω	†8.5KΩ	†8.5KΩ	0Ω		
V 5	6CB6	.5Ω	150Ω	.1Ω	0Ω	†10KΩ	†10KΩ	0Ω		
V 6	6AL5	.5Ω	2.2Meg	.1Ω	0Ω	0Ω	0Ω	5.6KΩ		
V 7	6AC7	0Ω	0Ω	0Ω	5.6KΩ	1.5KΩ	†60KΩ	.1Ω	†9.4KΩ	
V 8	6AU6	.7Ω	0Ω	.1Ω	0Ω	†9KΩ	†9KΩ	150Ω		
V 9	6AU6	100KΩ	0Ω	.1Ω	0Ω	†9KΩ	†9KΩ	150Ω		
V 10	6T8	Inf.	14KΩ	Inf.	.1Ω	0Ω	0Ω	0Ω	10Meg	†340KΩ
V 11	6C4	†55KΩ	47KΩ	.1Ω	0Ω	†55KΩ	380KΩ	50KΩ		
V 12	6AQ5	#330KΩ	#180Ω	0Ω	.1Ω	†475Ω	†255Ω	#330KΩ		
V 13	6AQ5	#330KΩ	#180Ω	.1Ω	0Ω	†475Ω	†225Ω	#330KΩ		
V 14	6AU6	†25KΩ	†10KΩ	.1Ω	0Ω	115KΩ	†7KΩ	†10KΩ		
V 15	12AT7	†20KΩ	16KΩ	0Ω	.1Ω	.1Ω	†30KΩ	1Meg	0Ω	0Ω
V 16	6C4	†85KΩ	Inf.	0Ω	.1Ω	†85KΩ	200KΩ	100KΩ		
V 17	6SN7GT	220KΩ 700KΩ	▲580KΩ	1.2KΩ	40KΩ	†100KΩ	1.2KΩ	.1Ω	0Ω	
V 18	6W6GT	0Ω	.1Ω	†1.1KΩ	†1.1KΩ	2.2Meg	Inf.	0Ω	5.5KΩ 470Ω	
V 19	12AU7	†85KΩ	720KΩ	1.2KΩ	.1Ω	.1Ω	†300KΩ	150KΩ 400KΩ	1.2KΩ	0Ω
V 20	6AU5GT	470KΩ	.1Ω	33Ω	Inf.	▲50Ω	Inf.	0Ω	▲39KΩ	
V 21	6W4GT	Inf.	Inf.	Inf.	Inf.	†50Ω	Inf.	.1Ω	0Ω	
V 22	1X2A	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ▲ 590Ω
V 23	5U4G	0Ω	13KΩ	†8KΩ	20Ω	Inf.	20Ω	Inf.	13KΩ	
V 24	20DP4	0Ω	12KΩ 30KΩ	PIN 10 †36Ω	PIN 11 60KΩ	PIN 12 .1Ω				

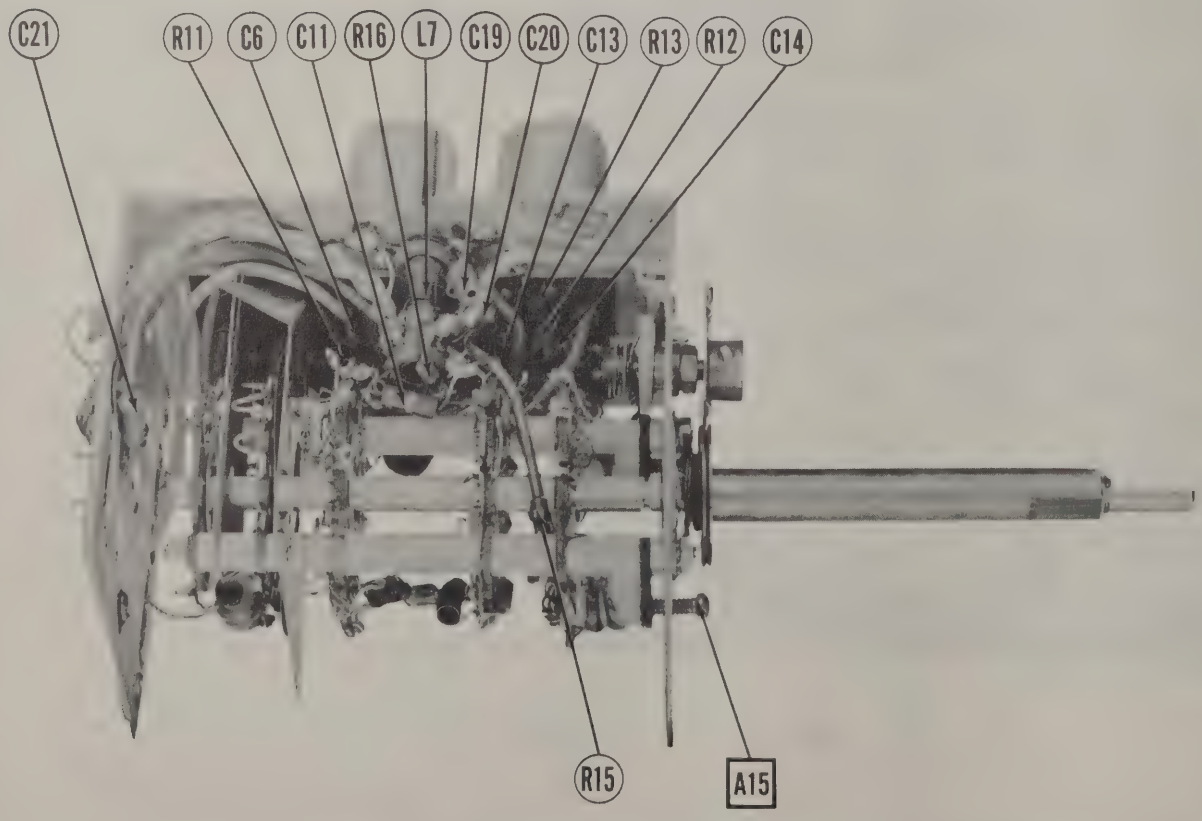
† MEASURED FROM PIN 2 OF V23
# MEASURED FROM 110VDC POINT
▲ MEASURED FROM PIN 3 OF V21

ALL MEASUREMENTS TAKEN WITH PICTURE TUBE REMOVED

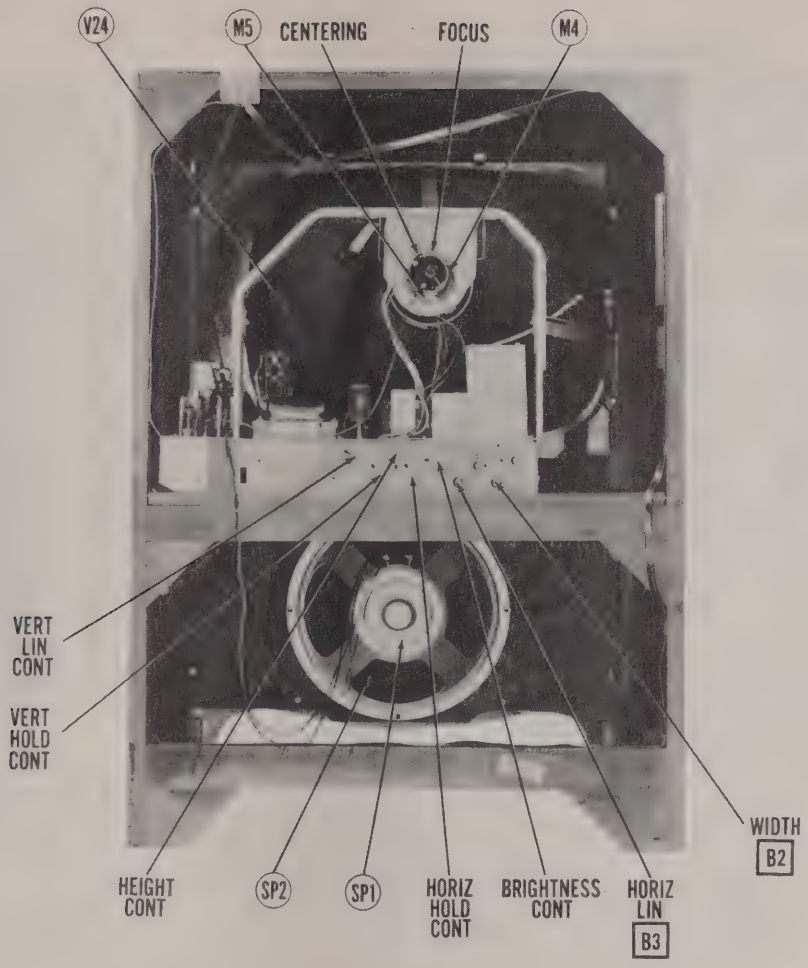
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold control to synchronize horizontally.

Adjust the "ringing" coil (B1) until the picture falls out of synchronization at each extreme of the hold control.

Adjust the width slug (B2) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug (B3) until the picture is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove five push-on type control knobs.
2. Remove six wood screws holding rear cover in place. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove antenna terminal strip.
5. Disconnect speaker.
6. Remove five 5/16" hex head bolts from chassis. Remove chassis.
7. Remove four 9/32" hex head bolts from speaker. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL, IT IS NECESSARY TO REMOVE THE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amplifier	6CB5	6CB5	7BD	
B	RF Amplifier	6AG5	6AG5	7BD	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp.	6CB6	6CB6	6CK	
V4	2nd Video IF Amp.	6CB6	6CB6	6CK	
V5	3rd Video IF Amp.	6CB6	6CB6	6CK	
V6	Video Detector - Noise Limiter	6AL5	6AL5	7BT	
V7A	Video Amplifier	6AC7	6AC7	8N	
B	Video Amplifier	6AB6	6AB6	7BK	
V8	1st Sound IF Amp.	6AU6	6AU6	7BK	
V9	2nd Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Det. AF Amp	6T8	6T8	9E	
V11	AF Phase Inv	6C4	6C4	6BG	
V12	Audio Output	6AQ5	6AQ5	7BZ	
V13	Audio Output	6AQ5	6AQ5	7BZ	
V14	Keyed AGC	6AU6	6AU6	7BK	
V15	Sync Amplifier--Sync Separator	12AT7	12AT7	9A	
V16	Phase Detector	6C4	6C4	6BG	
V17A	Vert. Mult.	6SN7GT	6SN7GT	8BD	
B	Vert. Mult.	12BH7	12BH7	9A	
C	Vert. Mult.	12AU7	12AU7	9A	
V18A	Vert. Output	6W6GT	6W6GT	7AC	
B	Vert. Output	6V6GT	6V6GT	7AC	
V19A	Horiz. Mult.	12AU7	12AU7	9A	
B	Horiz. Mult.	12BH7	12BH7	9A	
V20	Horiz. Output	6AU5GT	6AU5GT	6CK	
V21	Damper	6W4GT	6W4GT	4CG	
V22	H. V. Rectifier	1X2A	1X2A	7CB	
V23	L. V. Rectifier	5U4G	5U4G	5T	
V24	Picture Tube	20DP4	20DP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	V-9891	AF88366H		UPT4445-3335		TVL-4720	▲ Filter ■ Filter ▲ Decoupling Output Cathode
C2A	30	400	V-9892	AF62J30B		UPT3140V15		TVL-3754 TVA-1310	▲ Vert. Output Dec. ■ Output Cathode ▲ Vert. Output Cathode
B	10	400							V. Amp. Screen
C	150	50							
C3	10	250	V-10117	PRS250/12		BR1025		TVA-1504	Stabilizing Cap
C4	4	50	V-4637	PRS150/4		BR550		TVA-1303	
C5	15			SI15	D6-150		GP1K-15	19C22	RF Coupling
C6	1000			BPD-001	DD-102		801-001	19C1	AGC Filter
C7A	1000			BPD-2X001	DD-2-102		812-2X001	29C7	RF Amp. Cathode
B	1000								RF Amp. Dec.
C8	1000			BPD-001	DD-102		801-001	19C1	RF Amp. Cathode
C9	470			SI470	D6-471		GP2K-470	19C15	RF Amp. Dec.
C10	.25								RF Coupling
C11	.5				TCZ-.5				RF Coupling
C12	1.8								RF Coupling
C13	25			SI25	D6-250		GP1K-25	19C27	RF Coupling
C14	.68				TCZ-.68				Osc. Coupling
C15	10			SI10NPO	TCZ-10		NPOK-10	19C3	Osc. Grid Cap
C16	1.5						N330K-1.5		Osc. Feedback
C17	.68				TCZ-.68				Fixed Trimmer
C18	1000			BPD-001	DD-102		801-001	19C1	Conv. Fil.
C19	15			SI15	D6-150		GP1K-15	19C22	Fixed Trimmer
C20	1000			BPD-001	DD-102		801-001	19C1	RF Bypass
C21	680			SI680	D6-680		GP2K-680	19C17	Filament Bypass
C22	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C23	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	AGC Filter
C24	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	AGC Filter
C25	13		R3CC2CBL130K		TCZ-13		NPOK-13		Fixed Trimmer
C26	1.5		V-9926-1	SII. 5NPO	TCZ-1.5		NPOK-1.5		IF Coupling
C27	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	1st V. IF Dec.
C28	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	AGC Filter
C29	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	2nd V. IF Dec.
C30	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	2nd V. IF Fil.
C31	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	3rd V. IF Dec.
C32	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	3rd V. IF Fil.
C33	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	19C1	V. Det.-Noise Lim. Fil.
C34	270	500	RCM230B37K	SI270	D6-271	5W5T25	GP2K-270	19C31	Peaking
C35	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	Video Coupling
C36	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C37	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Pic. Tube Grid
C38	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	Pic. Tube Grid
C39	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	Filament Bypass
C40	4.7		V-9926-3	SII4.7NPO	TCZ-4.7	5R5V5	NPOK-4.7		S. IF Coupling
C41	120	500	RCM20B121K	SII20	D6-121		GP2K-120	19C29	Fixed Trimmer
C42	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C43	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	1st S. IF Dec.
C44	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	1st S. IF Cathode
C45	120	500	RCM20B121K	SII20	D6-121		GP2K-120	19C29	Fixed Trimmer
C46	47	500	RCM20B470K	1468-00005	D6-470	5W5Q5	GP1K-47	1FM-45	S. IF Coupling
C47	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	2nd S. IF Dec.
C48	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	2nd S. IF Cathode
C49	470		R5CC2QZT471K	SI470	D6-471	5W5T5	GP2K-470	19C15	Diode Load Cap
C50	.001	500	RCP10W2102M	P588-001	D6-102	PTE6D1	GP2L-001	6TM-D1	De-emphasis
C51	.005	600	RCP10W4502M	P588-005	D6-502	PTE6D5	811-005	6TM-D5	Audio Coupling
C52	.006	400	RCP10W4602M	P488-006	D6-562	PTE6D6		6TM-D6	Tone Comp.
C53	.005	400	RCP10W4502M	P588-005	D6-502	PTE6D5	811-005	6TM-D5	Audio Coupling
C54	150	500	RCM2CB151M	1468-00015	D6-151	5W5T15	GP2K-150	1FM-315	AF Amp. Plate
C55	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Audio Coupling
C56	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	Audio Coupling
C57	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	Audio Coupling
C58	.002	400	RCP10W4202M	P588-002	D6-202	PTE6D2	GP2M-002	6TM-D2	Output Plate

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C59	270	500	RCM20B271K	1468-00025	D6-271	5W5T25	GP2K-270	1FM-325	Sync. Coupling
C60	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Sync. Coupling
C61	.25	400	RCP10W4254M	P488-25		GT4P25		4TM-P25	Sync. Coupling
C62	22	500	RCM20D220K	SI22	D6-220	5W5Q25	GP1K-22	19C23	Noise Limiter Plate
C63	120	500	RCM20A121M	SII20	D6-121	5W5T15	GP2K-120	19C29	Sync. Coupling
C64	.001	400	RCP10W4102M	P688-001	D6-102	PTE6D1	GP2L-001	6TM-D1	Phase Det. Cath.
C65	470	500	RCM20B471K	SI470	D6-471	5W5T5	GP2K-470	19C15	Voltage Divider
C66	330	500	RCM20C331J	SI330	D6-331	5W5T3	GP3K-330	19C14	Horiz. Sweep Coupling
C67A	3000		▼V-8213	P688-003	▼	PTE6D2	GP2M-002	6TM-D2	Integrator Net
B	5000			P688-005	PC-100	PTE6D5	811-005	6TM-D5	Integrator Net
C	5000			P688-005		PTE6D5	811-005	6TM-D5	Integrator Net
C68	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Vert. MV Feedback
C69	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	Vert. MV Cath.
C70	.25	600	RCP10W4254M	684-25		GT6P25		6TM-P25	Vert. MV Plate Dec.
C71	.1	400	RCP10W4104M	P488-1		PTE4P1		4TM-P1	Vert. Discharge
C72	.1	600	V-6023-4104M	P688-1	DF-104	PTE6P1		6TM-P1	Vert. Sweep Coupling
C73	.005	400	RCP10W4502M	P688-005	D6-502	PTE6D5	811-005	6TM-D5	AFC Filter
C74	.05	400	RCP10W4503M	P488-05	DF-503	PTE6S5		4TM-S5	AFC Filter
C75	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	821-01	4TM-S1	AFC Filter
C76	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Horiz. MV Dec.
C77	.1	600	RCP10W6104M	P668-1	DF-104	PTE6P1		6TM-P1	Horiz. MV Dec.
C78	120	500	RCM20120J	1469-00015	D6-121	5R5T15	GP2K-120	MS-315	Horiz. MV Plate
C79	120	500	RCM20131J	1469-00015	D6-121	5R5T15	GP2K-120	MS-315	Horiz. MV Feedback
C80	3900	500	RCM30C392K	1464-004		1DR5D4		MS-24	Fixed Trimmer
C81	820	500	RCM20C821K	1464-0008		1W5T8		MS-38	Horiz. Discharge
C82	.01	600	RCP10W4103M	P668-01	D6-103	PTE6S1	821-01	6TM-S1	Horiz. Sweep Coupling
C83	.1	600	RCP10W4104M	P668-1	DF-104	PTE6P1		6TM-P1	Horiz. Output Screen
C84	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Horiz. Output Cathode †
C85	.06	600	RCP10M6603M	P888-06		PTE6S6		6TM-S6	Damper Filter
C86	.06	600	RCP10M6603M	P888-06		PTE6S6		6TM-S6	Damper Filter
C87	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	AGC Filter
C88	.25	400	RCP10W4254M	P488-25		GT4P25		4TM-P25	Horiz. Sweep Coupling
C89	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C90	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	29C1	Sync. Amp. Fil.
C91	500	30000	V-9901-1	HV20C	TV3-502				H. V. Filter
C92	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Tone Comp. •

* Used only in chassis V-2178-1 and V-2178-3.
† Some models use .01MFD in this application.
‡ Items C67A, C67B, C67C, R79A, R79B and R79C are combined into one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	INSTALLATION NOTES
R1A	1500Ω	½	V-9877			SBBT-565-S	Contrast Control - Front
B	500KΩ	½					Volume Control and SW - Tapped @ 50KΩ - Rear
R2A	5000Ω	½	V-8463	QII-114	AG-19-S	AN-10	Vertical Linearity Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R2A Per Instructions
R3A	1Meg	½	V-9813-2	QII-137	AG-61-S	B-69	Height Control
B	Shaft		Not req.	Not req.	FKS-1/4	Not req.	Attach to R3A Per Instructions
R4A	50KΩ	½	V-9916-1	QII-133	AG-44-S	AN-31	Brightness Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R4A Per Instructions
R5A	500KΩ	½	V-9894-1	QII-133	AG-58-S	AN-59	Vertical Hole Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R5A Per Instructions
R6A	250KΩ	½	V-9893-1	QII-130	AG-55-S	AN-50	Horizontal Hold Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R6A Per Instructions
R7	1Meg	½	V-10130-3				Tone Control - See Note

Note: Not used in chassis V-2178

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED
R8	4700Ω	½		BTS-4700	Antenna Coil Shunt - See Note 2
R9	2200Ω	½		BTS-2200	RF Amp. Grid
R10	100Ω 20%	½		BTS-100	RF Amp. Cathode
R11	2200Ω	½		BTS-2200	RF Amp. Decoupling
R12	4700Ω	½		BTS-4700	Mixer Grid
R13	220KΩ 20%	½		BTS-220K	Mixer Grid
R14	15KΩ 20%	½			Osc. Grid
R15	4700Ω 20%	½		BTS-4700	Osc. Plate
R16	4700Ω	½		BTS-4700	1st Video IF Transformer Shunt
R17	180Ω	½		BW-½-180	Decoupling - Wire Wound - See Note 3
R18	10KΩ 20%	½	RC20AE103M	BTS-10K	AGC Network
R19	4700Ω	½	RC20AE472K	BTS-4700	RF Coil Shunt
R20	10KΩ 20%	½	RC20AE103M	BTS-10K	AGC Network
R21	47KΩ	½	RC20AE473K	BTS-47K	AGC Network
R22	47KΩ	½	RC20AE473K	BTS-47K	AGC Network
R23	47Ω	½	RC20AE470K		1st Video IF Amp. Cathode
R24	1000Ω 20%	½	RC20AE102M	BTS-1000	1st Video IF Amp. Decoupling
R25	10KΩ 20%	½	RC20AE103M	BTS-10K	AGC Network
R26	4700Ω 5%	½	V-9927-2	BTS-4700-5%	2nd Video IF Transformer Shunt
R27	47Ω	½	RC20AE470K		2nd Video IF Amp. Cathode
R28	470Ω 20%	½	RC20AE471M	BTS-470	Decoupling
R29	150Ω	½	RC20AE151K	BTS-150	3rd Video IF Amp. Cathode
R30	470Ω 20%	½	RC20AE471M	BTS-470	3rd Video IF Amp. Decoupling
R31	3000Ω 5%	½	V-9927-5		3rd Video IF Transformer Shunt
R32	8200Ω 5%	½	V-9927-4		4th Video IF Transformer Shunt
R33	5600Ω 5%	½	V-9927-3	BTS-5600-5%	Video Det. Diode Load
R34	2.2Meg 20%	½	RC20AE225M	BTS-2.2Meg	Noise Limiter Diode Load
R35	3300Ω	½	RC40AE332K	BTB-3300	Voltage Divider
R36	4700Ω	½	RC20AE472K	BTS-4700	Keyed AGC Grid
R37	10KΩ	2	RC40AE103K	BTB-10K	Keyed AGC Cathode
R38	22KΩ 20%	½	RC20AE223M	BTS-22K	AGC Network
R39	68KΩ	1	RC30AE683K	BTA-68K	Video Amp. Screen
R40	4700Ω	1	RC30AE472K	BTA-4700	Video Amp. Plate
R41	4700Ω	1	RC30AE472K	BTA-4700	Video Amp. Plate
R42	68KΩ		RC20AE683K	BTS-68K	Video Peaking Coil Shunt
R43	100KΩ	½	RC20AE104K	BTS-100K	Voltage Divider
R44	68KΩ	½	RC20AE683K	BTS-68K	Voltage Divider
R45	12KΩ	½	RC20AE123K	BTS-12K	Picture Tube Grid
R46	100KΩ	½	RC20AE104K	BTS-100K	Picture Tube Cathode
R47	150Ω	½	RC20AE151K	BTS-150	1st Sound IF Amp. Cathode

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R48	100Ω	½	RC20AE102K	BTS-1000	1st Sound IF Amp. Decoupling
R49	100KΩ	½	RC20AE104K	BTS-100K	2nd Sound IF Amp. Grid
R50	150Ω	½	RC20AE151K	BTS-150	2nd Sound IF Amp. Cathode
R51	1000Ω	½	RC20AE102K	BTS-1000	2nd Sound IF Amp. Decoupling
R52	6800Ω 5%	½	RC20AE682J	BTS-6800-5%	Ratio Det. Diode Load
R53	6800Ω 5%	½	RC20AE682J	BTS-6800-5%	Ratio Det. Diode Load
R54	68KΩ	½	RC20AE683K	BTS-68K	De-emphasis
R55	22KΩ	½	RC20AE223M	BTS-22K	Tone Compensation
R56	10Meg	½	RC20AE106M	BTS-10Meg	AF Amp. Grid
R57	330KΩ	½	RC20AE334K	BTS-330K	AF Amp. Plate
R58	330KΩ	½	RC20AE334K	BTS-330K	Phase Inv. Grid
R59	3300Ω	½	RC20AE332K	BTS-3300	Phase Inv. Cathode
R60	47KΩ	½	RC20AE473K	BTS-47K	Phase Inv. Cathode
R61	47KΩ	½	RC20AE473K	BTS-47K	Phase Inv. Plate
R62	330KΩ	½	RC20AE334K	BTS-330K	Output Grid
R63	330KΩ	½	RC20AE334K	BTS-330K	Output Grid
R64	180Ω	1	RC30AE181K	BTA-180	Output Cathode
R65	220Ω	1	RC30AE221K	BTA-220	Output Decoupling
R66	8000Ω	10	V-9600-8	1 374A-400	Voltage Divider - Wire Wound
R67	10KΩ 20%	½	RC20AE103M	BTS-10K	Isolation
R68	1Meg	½	RC20AE105K	BTS-1Meg	Sync. Amp. Grid
R69	15KΩ 20%	½	RC20AE153M	BTS-15K	Sync. Amp. Plate
R70	1Meg	½	RC20AE105K	BTS-1Meg	Sync. Sep. Grid
R71	470KΩ 20%	½	RC20AE474M	BTS-470K	Isolation
R72	100KΩ	½	RC20AE104K	BTS-100K	Isolation
R73	100KΩ	½	RC20AE104K	BTS-100K	Phase Det. Grid - See Note 4
R74	100KΩ	½	RC20AE104K	BTS-100K	Phase Det. Cathode
R75	68KΩ	½	RC20AE683K	BTS-68K	Phase Det. Plate - See Note 5
R76	22KΩ	½	RC20AE223K	BTS-22K	Phase Det. Plate
R77	100KΩ	½	RC20AE104K	BTS-100K	Voltage Divider
R78	2200Ω	½	RC20AE222K	BTS-2200	Voltage Divider
R79A	22KΩ	½	V-9213 †	BTS-22K	Integrator
B	82000Ω	½		BTD-8200	Integrator
C	8200Ω	½		BTS-8200	Integrator
R80	1200Ω	½	RC20AE122K	BTS-1200	Vertical MV Cathode
R81	220KΩ	½	RC20AE224K	BTS-220K	Vertical MV Grid - See Note 6
R82	47KΩ	½	RC20AE473K	BTS-470K	Vertical MV Plate
R83	100KΩ	½	RC20AE104K	BTS-100K	Vertical MV Plate
R84	4700Ω	½	RC20AE472K	BTS-4700	Vertical Peaking - See Note 7
R85	2.2Meg	½	RC20AE225K	BTS-2.2Meg	Vertical Output Grid
R86	470Ω	½	RC20AE471K	BTS-470	Vertical Output Cathode
R87	470Ω	1	RC30AE471K	BTA-470	Vertical Output Decoupling
R88	470KΩ	½	RC20AE474K	BTS-470K	Horizontal AFC Filter
R89	47KΩ	½	RC20AE473K	BTS-47K	Horizontal MV Grid - See Note 2
R90	1200Ω	½	RC20AE122K	BTS-1200	Horizontal MV Cathode
R91	27KΩ	½	RC20AE273K	BTS-27K	Horizontal MV Plate - See Note 8
R92	56KΩ	1	RC30AE563K	BTA-56K	Horizontal MV Plate Decoupling
R93	150KΩ	½	RC20AE154K	BTS-150K	Horizontal MV Grid
R94	270KΩ	½	RC20AE274K	BTS-270K	Horizontal MV Plate
R95	33KΩ	½	RC20AE333K	BTS-33K	Decoupling
R96	12KΩ	½	RC20AE123K	BTS-12K	Horizontal Peaking
R97	120Ω 20%	½	RC20AE121M		Parasitic Suppressor
R98	470KΩ	½	RC20AE474K	BTS-470K	Horizontal Output Grid
R99	33Ω	2		BW-2-33	Horizontal Output Cathode - Wire Wound - See Note 2
R100	32KΩ	10	V-9600-10		Horizontal Output Screen - Wire Wound
R101	5600Ω	½	RC20AE562K	BTS-5600	Horizontal Linearity Coil Shunt
R102	470KΩ 20%	1	RC30AE474M		HV Filter
R103	220KΩ 20%	1	RC30AE224M	BTA-220K	Isolation
R104	1Meg	½	RC20AE105K	BTS-1Meg	Height Control Shunt - See Note 2

† Items R79A, R79B, R79C, C67A, C67B and C67C are combined into one unit.
Note 2. Not used in all models.
Note 3. Some models use 150Ω carbon resistor in this application.
Note 4. Some models use 68KΩ resistor in this application.
Note 5. Some models use 1 meg resistor in this application.
Note 6. Some models use 470KΩ resistor in this application.
Note 7. Some models use 330Ω resistor in this application.
Note 8. Some models use 18KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC	690VCT	5VAC	12.6VCT	V-9958	P-8156 ③ ④	P-3068 ③ ④	TP-385 ③ ④
	@ 2.1A	.225ADC	@ 3A	@ 5.6A	V-9958-2 ②			

② Used in some models.
③ Add series resistor to reduce plate voltage.
④ Redrill mounting holes.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	NOTES
T2	570Ω Tap 31Ω	13Ω Tape @ .5Ω, 8.9Ω	V-10204-1				Horizontal Output
T3	650Ω	7.8Ω	V-6981-3	A-8112 ①	A-3038	TS0-5	Vertical Output
T4A	12Ω		V-10045-1	DY-7			Horizontal Deflection Coil
B	46Ω						Vertical Deflection Coil

① Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	INSTALLATION NOTES
T5	7.4KΩ CT	3.2Ω	440Ω CT	.9Ω	V-9983		A-2938 ①	R0-304 ①	① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	Westinghouse PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	3.2Ω	V-9431-2 V-9770-1 ②	12J12	12A31	② Used in some models
	CONE DIA.	V. C. DIA.				
SP2	11 1/2"	1"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ω)	Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.225ADC	36Ω	1.2 Henries	V-6471-2	C-2326 ①	C-2974	TR3300 ①	① New mounting hole.

COILS (RF-IF)

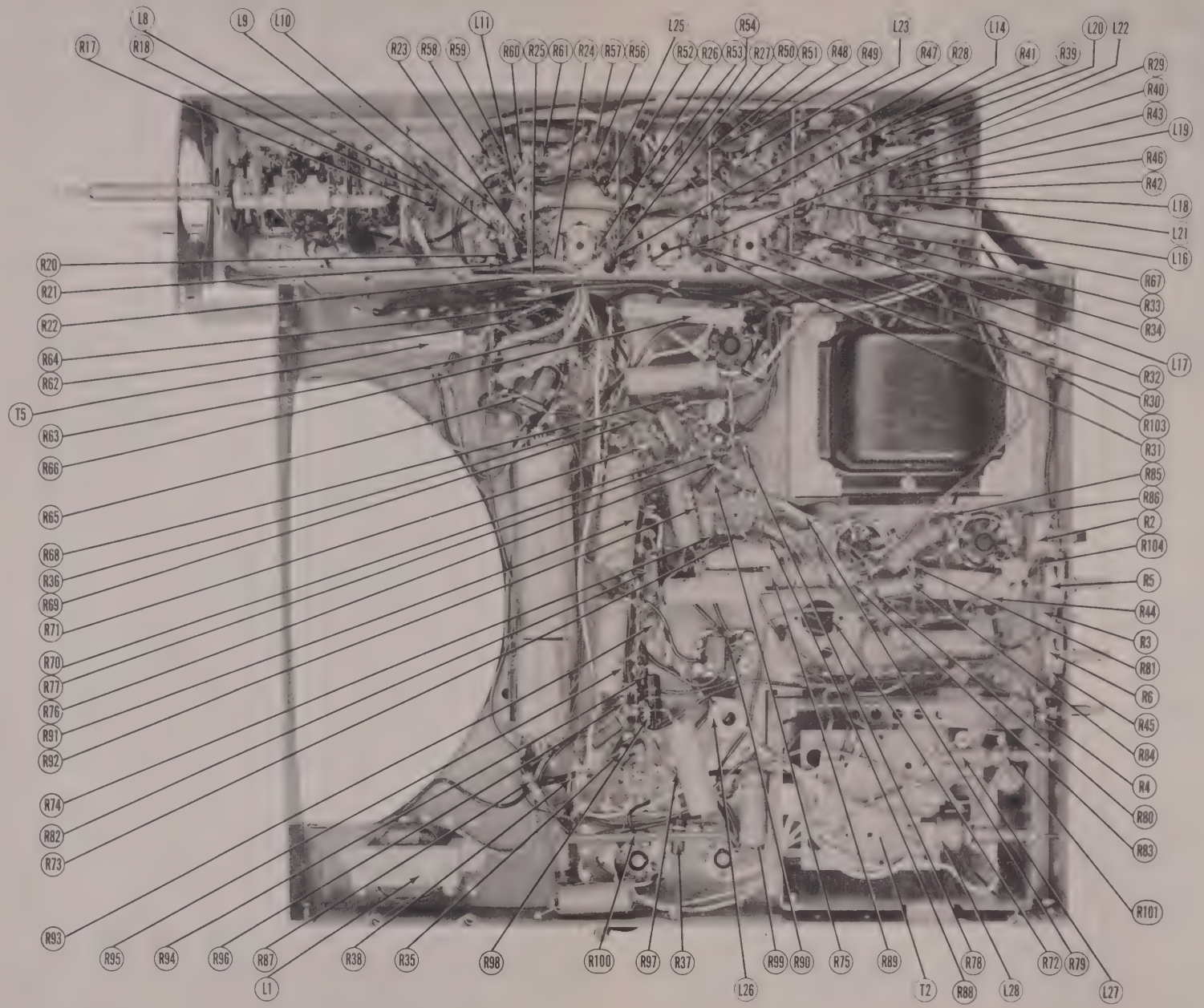
ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	IRC PART No.	
L2	Antenna Coil	.1Ω	.1Ω				
L3	Antenna Coil	.1Ω	.1Ω				
L4	RF Coil	0Ω					
L5	Mixer Grid Coil	0Ω					
L6	Osc. Coil	0Ω					
L7	Conv. Plate Coil	.1Ω	.1Ω				
L8	Fil. Choke	.1Ω					1.1 Microhenries
L9	1st Video IF	.1Ω	0Ω	V-9881-2			
L10	Sound Trap	.1Ω		V-9501-1			1.1 Microhenries (Black Dot)
L11	Fil. Choke	.1Ω		V-4886-2			1.1 Microhenries
L12	2nd Video IF	.6Ω	.5Ω	V-9879			
L13	3rd Video IF	.6Ω	.5Ω	V-9879			
L14	Fil. Choke	2.6Ω		V-9099-4		CL-1	3.9 Microhenries
L15	4th Video IF	.6Ω	.5Ω	V-9880			
L16	Sync. Dec.	1.2Ω		V-4886-1			14 Microhenries
L17	Peaking	4.6Ω		V-9915-1	19-1920		100 Microhenries
L18	Noise Clipper Decoupling	1.2Ω		V-4886-1			14 Microhenries
L19	Peaking	9.5Ω		V-9915-2	19-1923		350 Microhenries
L20	Peaking	12Ω		V-9915-3	19-1923		500 Microhenries
L21	Video Dec.	1.2Ω		V-4886-1			14 Microhenries
L22	1st Sound IF	.7Ω		V-9882-1			
L23	2nd Sound IF	.7Ω		V-9882-1			
L24	Ratio Det. Trans.	4.3Ω	1.4Ω	V-9884			
L25	Fil. Choke	.1Ω		V-4886-2			Not used in early H638K20 models
L26	Ringing Coil	120Ω		V-6767			
L27	Horiz. Lin.	20Ω		V-9960			
L28	Width Coil	1Ω	105Ω	V-9902			
L29	Fil. Choke	2.2Ω		V-9099-5		CLA	2.7 Microhenries (Not used in all H638K20 Models)

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					Westinghouse PART No.		
M1	Bayonet	6-8	.15	Brown	47		Type # 47 Model H642K20 (Only)
M2	Bayonet	6-8	.15	Brown	47		Type # 47 Model H642K20 (Only)

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M3A	RF Tuner	V-9886-5	Used in Chassis V-2178
B	RF Tuner	V-9886-6	Used in Chassis V-2178, V-2178-1
C	RF Tuner	V-10279-1	Used in Chassis V-2178-3
M4	Focus Magnet	V-10206-3	
M5A	Ion Trap	V-9784-2	Model H638K20
B	Ion Trap	V-9784-3	Model H642K20
	Escutcheon	V-9953-4	Channel (Model H638K20)
	Escutcheon	V-10446-1	Channel (Model H642K20)
	Safety Glass	V-9959-2	Model H638K20
	Safety Glass	V-10260-2	Model H642K20
	Knob	V-9941-1	Channel Selector (Model H638K20)
	Knob	V-10445-1	Channel Selector (Model H642K20)
	Knob	V-9940-1	Fine Tuning
	Knob	V-9938-1	Volume
	Knob	V-9939-1	Brightness (Model H638K20 ; Contrast Model H642K20)
	Knob	V-9939-3	Tone (Rear) Model H642K20
	Knob	V-9938-2	Tone (Front) Model H642K20
	Mask	V-10005-4	Picture Tube (Model H638K20)
	Mask	V-10005-6	Picture Tube (Model H642K20)



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PHOTOFACT* Folder

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MODEL 4120M

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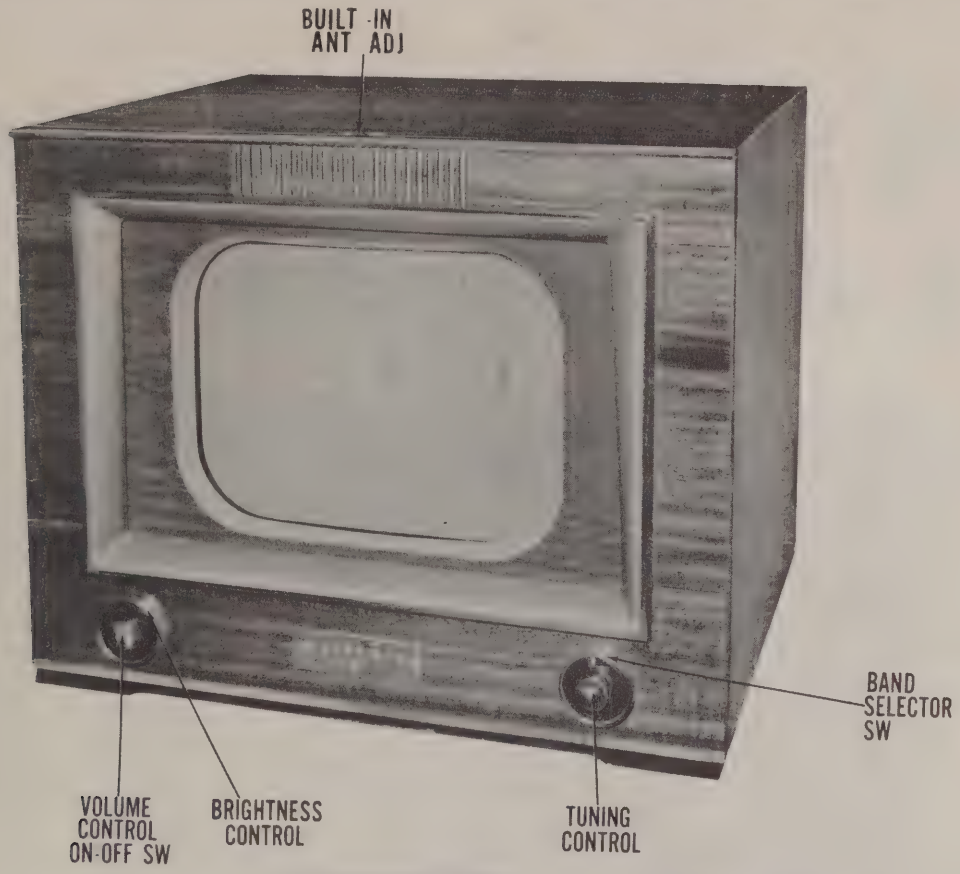

SYLVANIA MODEL 4120M

TRADE NAME	Sylvania	CHASSIS	MODELS
		1-260	4120M, 4130B, E, M, W
		1-261	6110X, 6120B, M, W, 6130B, M, W
		1-366	7110X, 7120B, M, W, 7130B, M, W
		1-366-66	7110XF, 7120BF, MF, WF, 7130BF, MF, WF
MANUFACTURER	Sylvania Elect. Prod., Inc., Colonial Radio and Tel. Div., 254 Rano St., Buffalo, New York		
TYPE SET	Television Receiver		
TUBES	Twenty Five		
POWER SUPPLY	110-120 Volts AC-60 Cycle		
RATING	2 Amp. at 117 Volts AC		
TUNING RANGE	Channels 2 thru 13		

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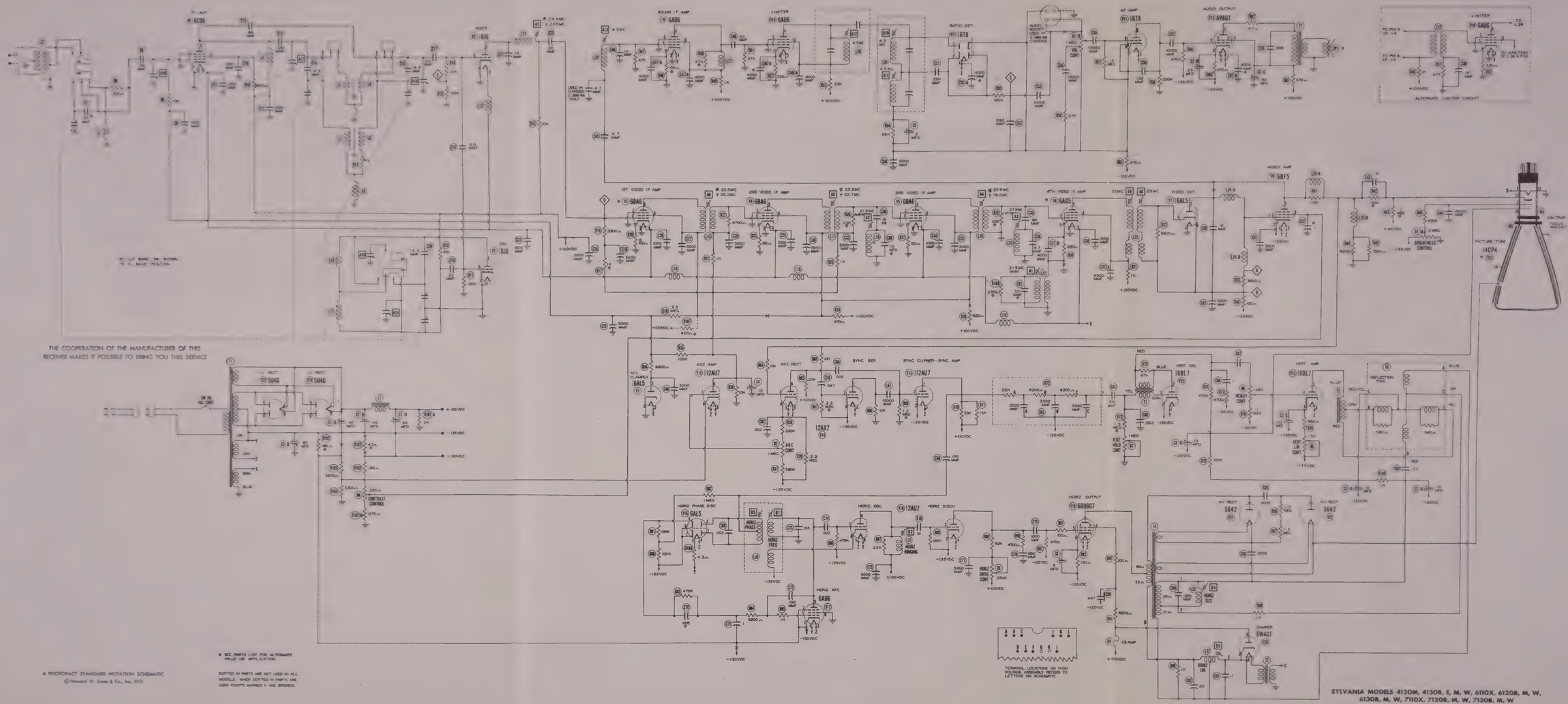
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TERMINAL LOCATIONS ON HIGH VOLTAGE ASSEMBLY REFERS TO LETTERS ON SCHEMATIC
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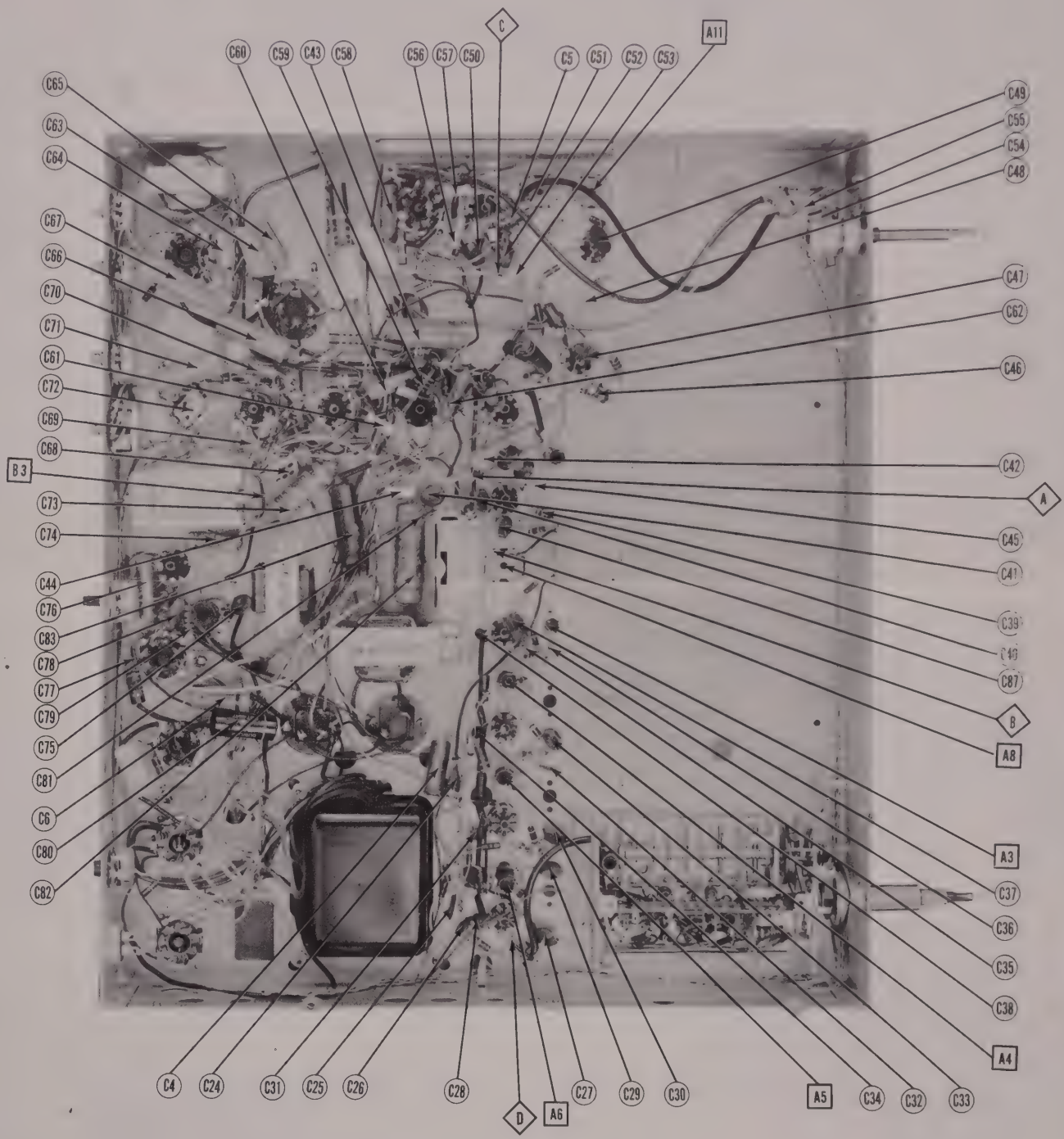
SYLVANIA MODELS 4120M, 4130B, E, M, W, 6110X, 6120B, M, W, 6130B, M, W, 7110X, 7120B, M, W, 7130B, M, W

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

SYLVANIA MODELS 4120M, 4130B, E, M, W, 6110X, 6120B, M, W, 6130B, M, W, 7110X, 7120B, M, W, 7130B, M, W

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V18) from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace it with a 6J6 which has pin 1 removed. This will disable the local oscillator and prevent erroneous indications. During video IF alignment the leads of the VTVM are connected to approximately 135 volts with respect to chassis, avoid touching or grounding the VTVM case. Connect the negative lead of a 3 volt battery to pin 2 of V7, connect the positive lead to chassis. Some models do not have sound traps A1 and A2. When aligning the sets without the trap, omit step 1 and use the alignment frequencies indicated by an asterisk (*). The alignment frequencies for the sets with trap, which are designed for fringe area reception, will be indicated by a dagger (†).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	Not used	† 21.9MC (unmod.)	Any	USE VTVM DC probe to point (A) Common to point (B)	A1, A2	Adjust for MINIMUM deflection.
2.	"	"	"	† 27.9MC	"	"	A3	"
3.	"	"	"	* 25.9MC † 26.0MC	"	"	A4	Adjust for maximum deflection.
4.	"	"	"	* 23.6MC † 22.7MC	"	"	A5	"
5.	"	"	"	* 25.5MC † 25.3MC	"	"	A6	"
6.	"	"	"	* 24.5MC † 23.5MC	"	"	A7	"
7.	.005MFD	High side to pin 1 (grid) of 6AG5 (V6). Low side to chassis.	24MC (10MC SWP)	23MC 27MC	"	Vert. amp. to point (A). Low side to chassis.	A8, A9	Adjust for response curve similar to fig. 1. If set has traps A1 and A2 adjust for curve to fig. 1A.
8.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	"	*23.5MC * 26.4MC † 21.9MC † 22.75MC † 26.4MC	"	"		Check for response curve similar to fig. 2. (fig. 2A if set has traps). If necessary retouch A4 thru A7 for proper response.

SOUND IF ALIGNMENT

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.005MFD	High side to pin 1 (cathode) of 6AL5 (V7). Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. amp. to point (C). Low side to chassis.	A10, A11, A12, A13	Adjust A10 and A-11 simultaneously to place 4.5MC marker at center of crossover lines as per fig. 3. Adjust A12 and A13 for max. amplitude and straightness of crossover lines. Repeat the adjustments until no further improvement can be made.

RF TUNER ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in ite socket.

The use of 2 marker generators are required to align the RF tuner.

Marker generator No. 1 is connected in parallel with the sweep generator with a 2 or 3 MMF capacitor, (if the sweep generator has a built in marker, it will be used for marker No. 1).

The frequency to which marker No. 1 is tuned will be indicated by symbol (§).

Marker generator No. 2 is connected to the tuner output, (alignment point (E), through a 2 or 3MMF capacitor. The frequency to which marker No. 2 is tuned will be indicated by a diamond symbol (♦).

Remove the second video IF amplifier tube (V4) from its socket.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

HIGH BAND OSCILLATOR ALIGNMENT

Turn the tuner band switch to high band (counter - clockwise).
Remove the tuner bottom cover.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	177MC (10MC SWP)	§ 175.25MC ♦ 21.9MC	Tuning gang fully closed	Vert. amp. thru detector (fig. 4) to point (D). Low side to chassis.	L10	With a non-metallic tool, expand or compress coil turns until markers coincide at 100% response as per fig. 5. Replace the bottom cover. If markers separate make slight compensating adjustment of L10 so markers will coincide with bottom cover in place.
11.	"	"	213MC (10MC SWP)	§ 215.75MC ♦ 26.4MC	Tuning gang fully open	"	A14	Adjust A14 until markers coincide at 100% response. Repeat steps 10 and 11 until high band oscillator covers proper tuning range.

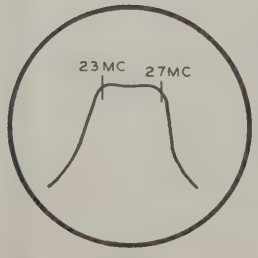


FIG.1

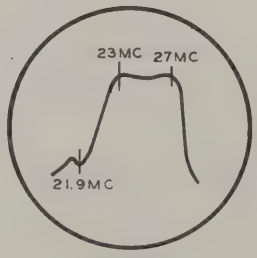


FIG.1A

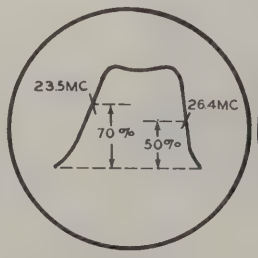


FIG.2

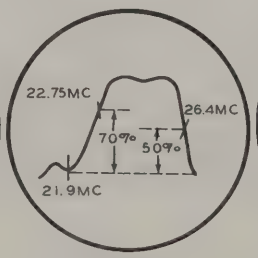


FIG.2A

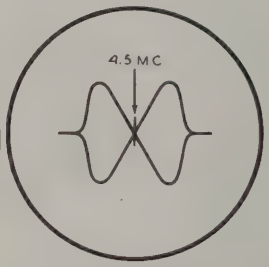


FIG. 3

ALIGNMENT INSTRUCTIONS (CONT.)

LOW BAND OSCILLATOR ALIGNMENT

Turn the tuner band switch to low band (clockwise).
Remove the bottom cover.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC SWP)	§ 56.75MC ♦ 21.9MC	Tuning gang fully closed.	Vert. amp. thru detector (fig. 4). to point Ⓓ.	L11	With a non-metallic tool, expand or compress coil turns until markers coincide at 100% response.
13.	"	"	85MC (10MC SWP)	§ 84.35MC ♦ 26.4MC	Tuning gang fully open.	"	A15	Adjust A15 until markers coincide at 100% response. Repeat step 12, and recheck high band channels.

HIGH BAND RF ALIGNMENT

Turn tuner band switch to high band (counter-clockwise).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	177MC (10MC SWP)	§ 175.25MC ♦ 26.4MC	7	Vert. amp. thru detector (fig. 4). to point Ⓓ. Low side to chassis.		Adjust tuning control until markers co-incide.
15.	"	"	"	175.25MC 179.75MC	7	Vert. amp. thru 10KΩ to point Ⓔ. Low side to chassis.	L3, L5, L6	Push the coils on or off of the brass plug for response curve similar to fig. 6. L5 and L6 are properly adjusted when a slight change of either coil causes a frequency shift of the entire response curve with no noticeable narrowing of band width. L3 is properly adjusted when a slight change causes the peaks to rock equally. The bandwidth is adjusted by altering the dress of L5 and L6 ground leads past the cutout in the shield partition. Replace the bottom cover and note any change in response. If necessary make compensating adjustments of L5 and L6.
16.	"	"	213 MC (10MC SWP)	§ 215.75MC ♦ 21.9MC	13	Vert. amp. thru detector (fig. 4) to point Ⓓ. Low side to chassis.		Adjust tuning control until markers coincide.
17.	"	"	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. amp. thru 10KΩ to point Ⓔ. Low side to chassis.	A16, A17, A18	Adjust for response curve similar to fig. 6. Recheck channel 7. If necessary repeat steps 14 thru 17.

LOW BAND RF ALIGNMENT

Turn the tuner band switch to low band (clockwise).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC SWP)	§ 59.75MC ♦ 21.9MC	2	Vert. amp. thru detector (fig. 4) to point Ⓓ. Low side to chassis.		Adjust tuning control until markers coincide.
19.	"	"	"	55.25MC 59.75MC	2	Vert. amp. thru 10KΩ to point Ⓔ. Low side to chassis.	L2, L7, L8	Expand or compress coil turns for response curve similar to fig. 6. L7 and L8 are properly adjusted when a slight change causes the response frequency to change without noticeable narrowing of bandwidth. L2 is properly adjusted when a slight change causes the peaks to rock evenly. The band width is adjusted by expanding or compressing the turns of L9. Replace the cover. If any change is noted, make compensating adjustments of L7 and L8.
20.	"	"	85MC (10MC SWP)	§ 83.25MC ♦ 26.4MC	6	Vert. amp. thru detector (fig. 4) to point Ⓓ. Low side to chassis.		Adjust tuning control until markers coincide.
21.	"	"	"	83.25MC 87.75MC	"	Vert. amp. thru 10KΩ to point Ⓔ. Low side to chassis.		Check for response similar to fig. 6. If necessary remove the bottom cover and make slight compromise adjustments of L7 and L8. Recheck channel 2. Repeat steps 18 thru 21 until best overall response is obtained across the low band channels.

AGC ADJUSTMENT

Connect an antenna, turn the set on, and tune to an unused channel.

Adjust the AGC thresholdcontrol until a VTVM connected between pin 6 of V13 and chassis, reads negative .1 volt. On some receivers the closest approach to this value will occur with the control at fully clockwise.

Turn the contrast control to slightly less than maximum and tune in the strongest available TV station.

Again read the AGC voltage. If the voltage is less than 2 volts negative, leave the control as set.

If the voltage is more than 2 volts negative, slowly turn the AGC control counter-clockwise while observing the picture.

The picture will get darker and finally start to fall out of sync. as evidenced by a sudden shift or jittering of the picture.

Do not turn control beyond this point. Slowly back off (clockwise) to a point just beyond where the picture holds sync without flutter.

Turn the volume control to approximately normal. If intercarrier buzz is objectional, back off the AGC threshold control until the buzz ceases to be objectional. If more than a slight decrease in signal is required to remove the buzz, recheck the sound IF alignment.

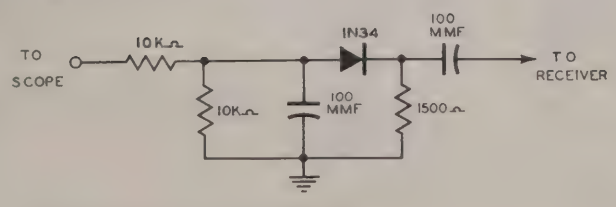


FIG.4

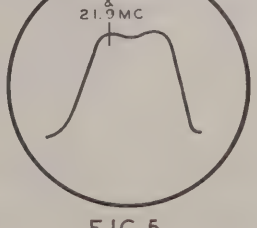


FIG.5

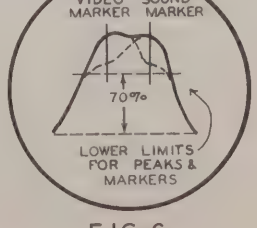


FIG.6

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	-2VDC 0V	0V	0V	6.1VDC	100VDC	75VDC	0V		
V 2	6J6	65VDC	65VDC	6.1VDC	0V	-1.4VDC	§-6.9VDC	0V		
V 3	6BA6	0V -7VDC	0V	0V	6VAC	100VDC	100VDC	.8VDC		
V 4	6BA6	0V -7VDC	0V	0V	6.1VAC	100VDC	100VDC	.8VDC		
V 5	6BA6	0V -7VDC	0V	0V	6.2VAC	105VDC	105VDC	1VDC		
V 6	6AG5	0V	1.4VDC	0V	6.3VAC	110VDC	110VDC	1.4VDC		
V 7	6AL5	#0V	-.1VDC	6.3VAC	0V	0V	#0V	#-3.8VDC		
V 8	6BF5	#-.2VDC	#0V	#6.3VAC	#0V	#90VDC #60VDC	#37VDC #15VDC	#-.2VDC		
V 9	6AU6	0V	0V	0V	6.3VAC	110VDC	110VDC	1VDC		
V 10	6AU6	0V	0V	6.3VAC	0V	65VDC	65VDC	.8VDC		
V 11	6T8	#-.2VDC	#-14VDC	#-2VDC	#6.3VAC	#0V	#.2VDC	#.2VDC	#-.2VDC	#65VDC
V 12	6V6GT	0V	#6.3VAC	#200VDC	#220VDC	#0V	#200VDC	#0V	#12VDC	
V 13	12AU7	#215VDC	#-1VDC	#0V	#6.3VAC	#6.3VAC	#-100VDC #-125VDC	#-35VDC #-65VDC	#65VDC	#0V
V 14	12AX7	#65VDC	#-.6VDC	#0V	#0V	#0V	#240VDC	#75VDC #90VDC	#100VDC #85VDC	#6.3VAC
V 15	6BL7GT	#-70VDC #-85VDC	#190VDC	#0V	#0V	#360VDC	#33VDC #17VDC	#0V	#6.3VAC	
V 16	6AL5	#0V	#-12VDC	1.2VAC	#6.3VAC	#-.1VDC	#0V	#-12VDC		
V 17	6AU6	#0V #.4VDC	#4.2VDC #3.5VDC	#6.3VAC	#0V	#140VDC #110VDC	#0V	#4.2VDC #3.5VDC		
V 18	12AU7	#120VDC #50VDC	#-32VDC	#0V	#6.3VAC	#6.3VAC	#240VDC	#-22VDC	#.1VDC	#0V
V 19	6BQ6GT	#155VDC	#0V	0V	#155VDC	#-18VDC #0V	#-18VDC #0V	#6.3VAC	#16VDC	TOP CAP *
V 20	6W4GT	#-18VDC #0V	0V	250VDC	0V	100VDC	#120VDC #50VDC	250VDC	250VDC	
V 21	5642	* DO NOT MEASURE								
V 22	5642	* DO NOT MEASURE								
V 23	5U4G	0V	#255VDC	0V	#250VAC	0V	#250VAC	0V	#255VDC	
V 24	5U4G	0V	#255VDC	#100VDC #85VDC	#250VAC	0V	#250VAC	#0V	#255VDC	
V 25	14CP4	6.3VAC	#0V	PIN 10 #340VDC	PIN 11 #105VDC	PIN 12 0V				

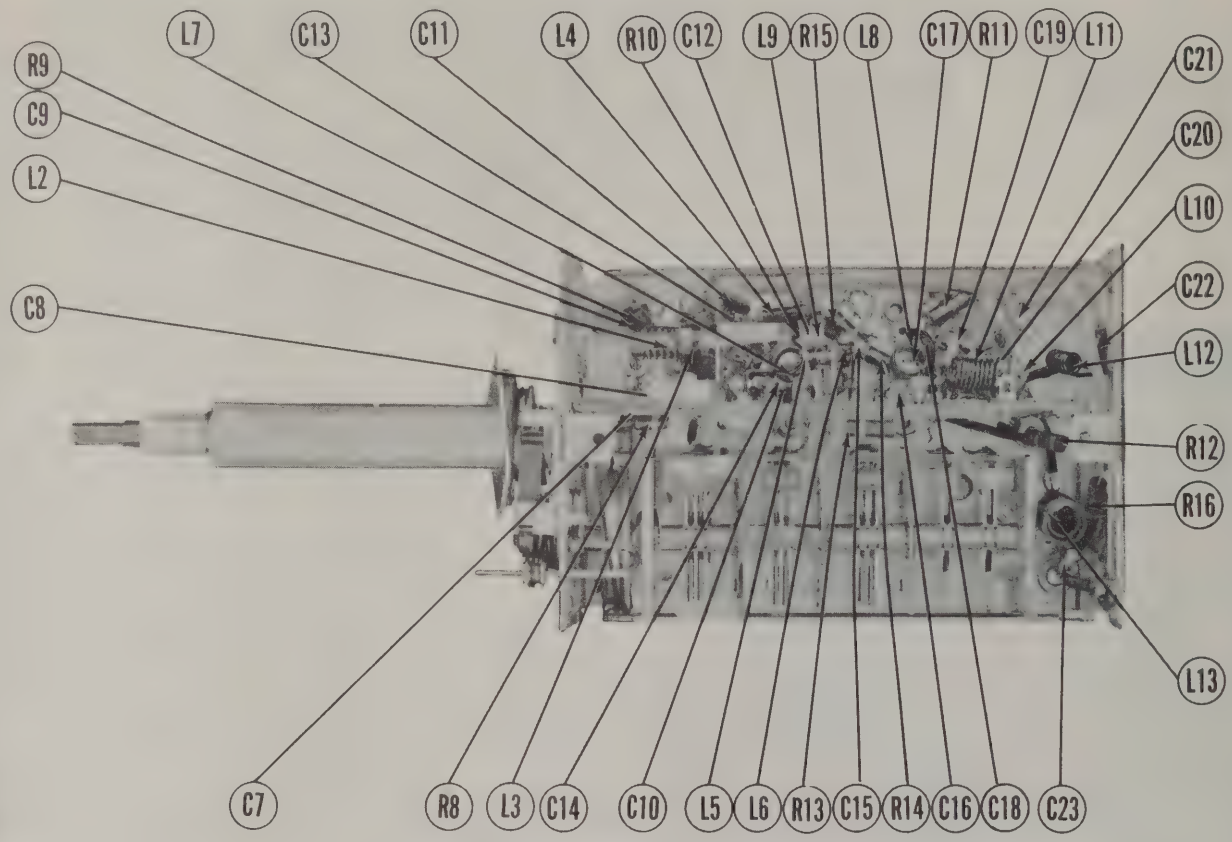
§ TAKEN WITH VACUUM TUBE VOLTMETER
# MEASURED FROM -135VDC POINT
* DO NOT MEASURE

RESISTANCE READINGS

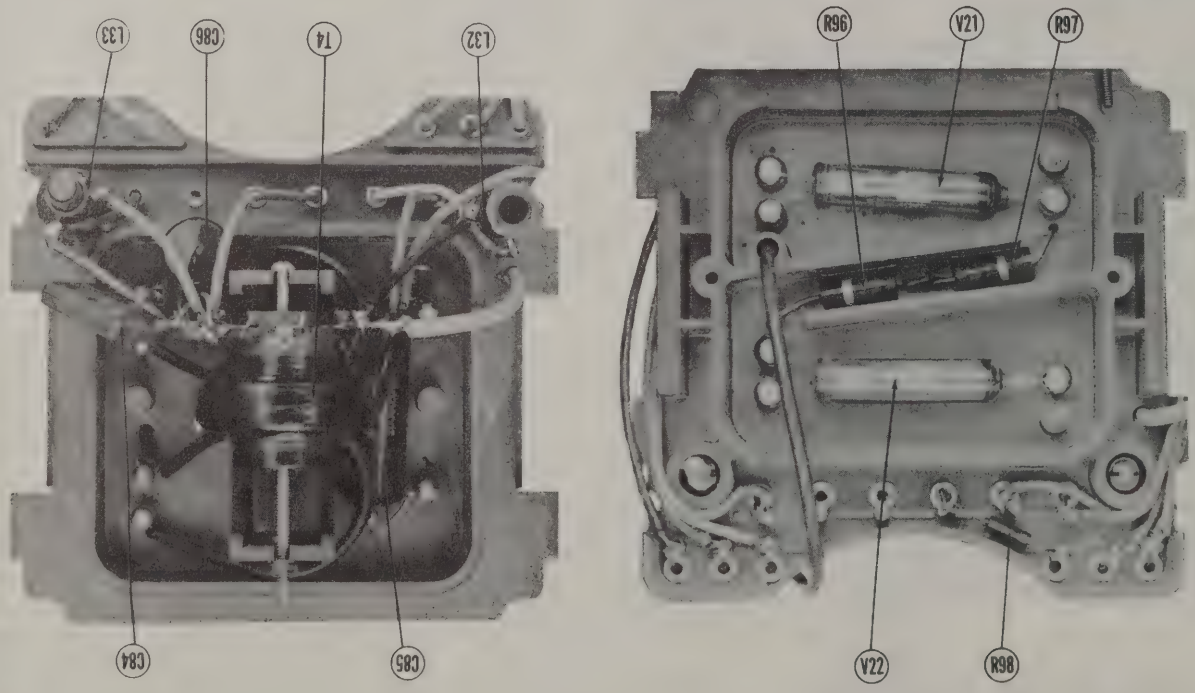
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	120KΩ	0Ω	0Ω	.1Ω	†40Ω	†6.8KΩ	0Ω		
V 2	6J6	†10KΩ	†10KΩ	.1Ω	0Ω	110KΩ	22KΩ	0Ω		
V 3	6BA6	14KΩ	0Ω	0Ω	.1Ω	†510Ω	†510Ω	82Ω		
V 4	6BA6	11KΩ	0Ω	0Ω	.1Ω	†510Ω	†510Ω	82Ω		
V 5	6BA6	11KΩ	0Ω	0Ω	.1Ω	†860Ω	†860Ω	82Ω		
V 6	6AG5	.7Ω	220Ω	0Ω	.1Ω	†1KΩ	†1KΩ	220Ω		
V 7	6AL5	#100Ω	115KΩ	.1Ω	0Ω	0Ω	#100Ω	#4KΩ		
V 8	6EF5	#4KΩ	#0Ω	#.1Ω	#0Ω	4KΩ	#230Ω #475Ω	#4KΩ		
V 9	6AU6	47KΩ	0Ω	0Ω	.1Ω	†1KΩ	†1KΩ	100Ω		
V 10	6AU6	47KΩ	0Ω	.1Ω	0Ω	†22KΩ	†22KΩ	330Ω		
V 11	6T8	Inf.	#68KΩ	Inf.	#.1Ω	#0Ω	#470Ω	#470Ω	#15Meg	220KΩ
V 12	6V6GT	Inf.	#.1Ω	†1.1KΩ	†510Ω	#470KΩ	†1.1KΩ	#0Ω	#270Ω	
V 13	12AU7	†11KΩ		§0Ω	#.1Ω	#.1Ω	10KΩ	#560KΩ #1Meg	#2.2KΩ	#0Ω
V 14	12AX7	12KΩ	#2.2Meg	#0Ω	#0Ω	#0Ω	†33KΩ	#15KΩ	#1.1Meg	#.1Ω
V 15	6BL7GT	#1.5Meg #2.5Meg	♦570KΩ	#0Ω	#1Meg #2Meg	♦1.9KΩ	#5.7KΩ #680Ω	#0Ω	#.1Ω	
V 16	6AL5	#0Ω	#1.1Meg	#2Ω	#.1Ω	#200KΩ	#0Ω	#1.1Meg		
V 17	6AU6	#590KΩ	#47Ω	#.1Ω	#0Ω	40Ω	0Ω	#47Ω		
V 18	12AU7	†82KΩ †330KΩ	#150KΩ	#0Ω	#.1Ω	#.1Ω	†80Ω	#470KΩ	#10Ω	#0Ω
V 19	6BQ6GT	†8.2KΩ	#0Ω	Inf.	†8.3KΩ	#470KΩ	#470KΩ	#.1Ω	#150Ω	TOP CAP ♦35Ω
V 20	6W4GT	#470KΩ	Inf.	120KΩ	Inf.	†40Ω	†87KΩ †335KΩ	♦.5Ω	♦0Ω	
V 21	5642	INFINITE RESISTANCE EXCEPT PLATE (#132Ω)								
V 22	5642	INFINITE RESISTANCE								
V 23	5U4G	Inf.	3KΩ	Inf.	#10Ω	Inf.	#10Ω	Inf.	3KΩ	
V 24	5U4G	Inf.	3KΩ	#1.1Meg	#10Ω	Inf.	#10Ω	#0Ω	3KΩ	
V 25	14CP4	.1Ω	450KΩ	PIN 10 ♦100KΩ	PIN 11 155KΩ	PIN 12 0Ω				

† MEASURED FROM PIN 8 OF V24
# MEASURED FROM -135VDC POINT
♦ MEASURED FROM PIN 3 OF V20

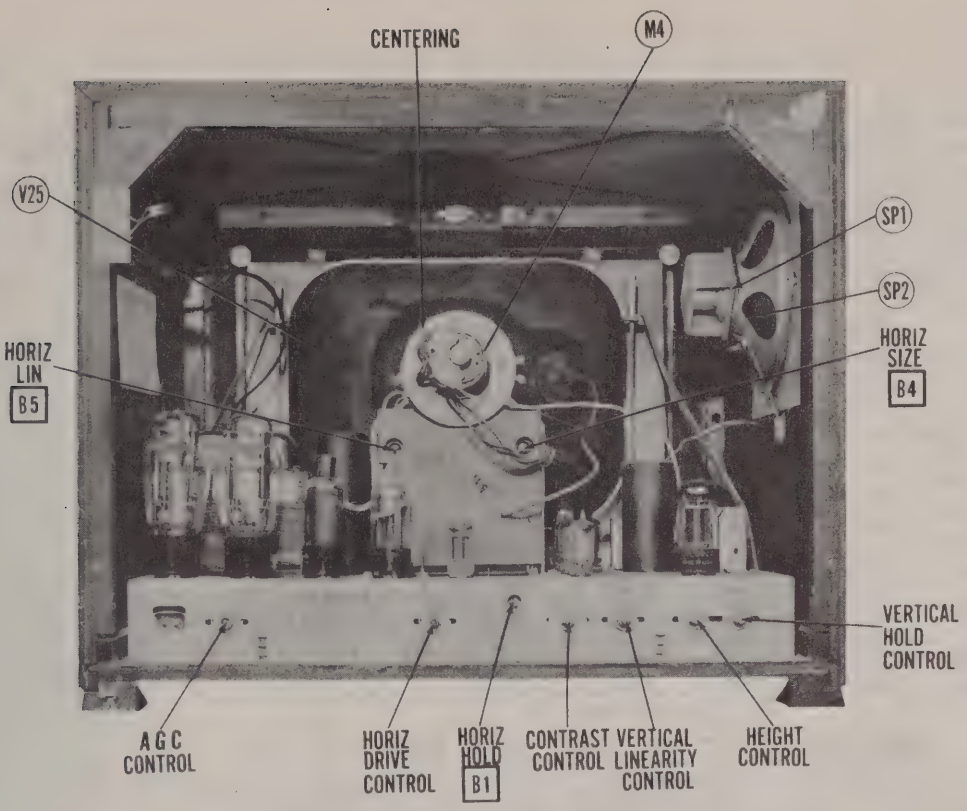
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



RF TUNER



HIGH VOLTAGE SUPPLY



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ALIGNMENT

Horizontal oscillator check

a) Turn the set on and tune in a TV station, preferably a test pattern. The picture should pull into sync.
b) Momentarily remove the signal by tuning to another channel and back again. The picture should fall into sync.
c) Turn the set off for about five minutes, upon turning the set back on the picture should pull into sync.

Slight retouch adjustment

If the oscillator failed any of the above checks, it may be possible to correct them with a slight retouch adjustment as follows:

1) Remove the horizontal discriminator tube (V16) from its socket.
2) Adjust the horizontal frequency slug (B1) until the picture moves slowly back and forth across the screen with the blanking bar vertical.
3) Replace V16 in its socket.
4) Repeat the oscillator check. If the oscillator fails to synchronize properly proceed with complete oscillator alignment.

Complete horizontal oscillator alignment.

a) Turn the core of the "ringing" coil (B2) fully out, (counter-clockwise), and short R90.
b) Remove the horizontal discriminator (V16) from its socket.
c) Adjust B1 until the picture moves slowly back and forth across the screen with the blanking bar vertical.
d) Replace V16 in its socket.
e) Reduce the contrast, and increase the brightness until the normally blanked edges of the raster are visable.
f) Adjust the horizontal phasing slug (B3) until the blanking bar showing is approximately 1/8 inch wide.
g) Remove the short from R90 and adjust the horizontal drive control as outlined under horizontal linearity adjustments.
h) Adjust B2 until 1/8 inch of blanking again appears at the edge of the raster.

Check the oscillator pull in range as follows:

Turn B1 until the picture falls out of sync.

Slowly turn B1 towards original setting and carefully not the lease number of bars present just before the picture pulls into sync. Repeat the check for both directions of rotation. If the number of bars is less than 3 or more than 4, repeat complete horizontal oscillator alignment.

Repeat the check of horizontal oscillator.

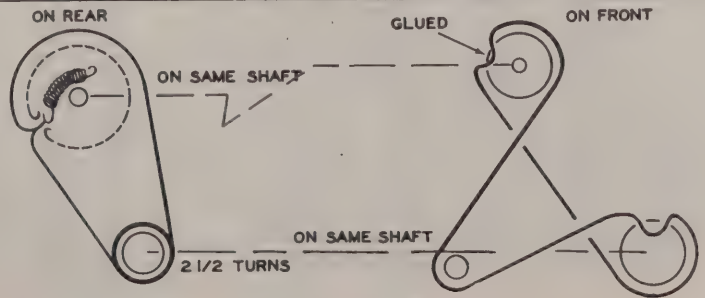
HORIZONTAL LINEARITY ADJUSTMENTS

Adjust the horizontal drive control clockwise until the picture starts to crowd in the center, and then counter-clockwise just far enough to remove the crowding.

Adjust the horizontal size slug (B4) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug until the picture is symmetrical from left to right.

These three adjustments are interacting and therefore may require alternate adjustment for optimum results.



TUNING DRIVE CORD

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SYLVANIA PART No.	STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp	623-0022G	6CB6GT	6CK	
V2	Converter	623-0002G	6J6	7BF	
V3A	1st Video IF Amp	623-0004G	6HA6	7BK	
B	1st Video IF Amp	623-0005G	6AU6	7BK	
V4	2nd Video IF Amp	623-0004G	6HA6	7BK	
V5	3rd Video IF Amp	623-0004G	6HA6	7BK	
V6A	4th Video IF Amp	623-0003G	6AG5	7BD	
B	4th Video IF Amp	623-0081G	6HC5	7BD	
V7	Video Det. AGC Clamp	623-0003G	6AL5	6BT	
V8	Video Amp	623-0007G	6HF5	7BZ	
V9	Sound IF Amp	623-0006G	6AU6	7BK	
V10	Limiter	623-0005G	6AU6	7BK	
V11	Ratio Det. AF Amp	623-0010G	6T8	9E	
V12	Audio Output	623-0004G	6V6GT	7AC	
V13	Sync Amp. Sync Amp. Sync. Clipper	623-0008G	12AU7	9A	
V14	Sync. Sep. AGC Rectifier	623-0008G	12AX7	9A	
V15	Vert. Osc. - Vert. Amp.	623-0011G	6BL7GT	7DF	
V16	Hor. Phase Discr.	623-0003G	6AL5	6BT	
V17	Horiz. AFC	623-0005G	6AU6	7BK	
V18	Hor. Osc. - Hor. Driver	623-0006G	12AU7	9A	
V19	Horiz. Output	622-0008G	6BQ6GT	6AM	
V20	Damper	633-0004G	6W4GT	4CG	
V21	H.V. Rectifier	638-0001G	5642	5642	
V22	H.V. Rectifier	638-0001G	5642	5642	
V23	L.V. Rectifier	633-0003G	5U4G	5T	
V24	L.V. Rectifier	633-0003G	5U4G	5T	
V25A	Picture Tube	642-0004G	14CP4	12D	
B	Picture Tube	642-0006G	16KP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C2A	40	350	161-2003	AFH816H		UPT44445		TVL-2675	▲ Filter
B	60	350							▲ Filter
C2A	10	450	161-4002	AFH2J812H5A		UPT424		TVL-4707	▲ Decoupling
B	40	350							■ Filter
C	60	350							▲ Output Decoupling
D	25	25							Output Cathode
C3A	10	450	161-4003	AFH22J20B 12E		UPT411		TVL-4705	▲ Decoupling
B	10	400							■ Decoupling
C	100	50							▲ Vert. Output Cath.
D	60	200							Filter
C4	10	25	161-1000	SRE25/10		BBR10-25T		TVA-1204	AGC Filter
C5	2	50	161-1001	PRS150/4		BBR2-50T		TVA-1301	Stabilizing Cap.
C6	2	50	161-1001	PRS150/4		BBR2-50T		TVA-1301	Hor. Output Cath.
C7	25						N080-331-25		Fixed Padder *
C8	100			SI100	D6-101		GPIK-100	19C11	RF Coupling
C9	1000			BPD-001	DD-102		801-001	19C1	AGC Filter
C10	1000			BPD-001	DD-102		801-001	19C1	RF Amp. Screen
C11	1000			BPD-001	DD-102		801-001	19C1	RF Amp. Fil.
C12	1000			BPD-001	DD-102		801-001	19C1	RF Bypass
C13	100			SI100	D6-101		GPIK-100	19C11	RF Coupling
C14	14-5						NPOK-14.5		Fixed Padder
C15	68				TCZ-.68				RF Coupling
C16	16-5						NPOK-16.5		Fixed Padder
C17	100			SI100	D6-101		GPIK-100	19C11	RF Coupling
C18	3-3			SI3.3NPO	TCZ-3.3		NPOK-3.3		Osc. Coupling
C19	33			SI33	D6-330		GPIK-33	19C24	Osc. Grid Cap
C20	12-5						N470K-12.5		Fixed Trimmer
C21	60			SI0N750	TCN-10		N750L-10	19C4	Fixed Trimmer
C22	4000			BPD-001	DD-102		801-001	19C1	Filament Bypass
C23	100			SI100	D6-101		GPIK-100	19C11	IF Coupling
C24	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C25	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C26	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C27	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	1st V. IF Dec.
C28	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	19C1	1st V. IF Fil.
C29	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C30	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	2nd V. IF Dec.
C31	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	19C1	2nd V. IF Fil.
C32	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C33	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	3rd V. IF Dec.
C34	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	19C1	3rd V. IF Fil.
C35	68		168-3004P		TCZ-.68				IF Coupling
C36	4-7		168-3008N	SI4.7NPO	TCZ-4.7		NPOK-4.7		Fixed Trimmer
C37A	4000		168-3003D	BPD-2X004	DD-2-502	1D5D4	822-2X004	36C2	4th V. IF Dec.
B	4000					1D5D4			4th V. IF Cath.
C38	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	19C1	4th V. IF Fil.
C39	10		166-0010P	SI10NPO	TCZ-10	5R5Q1	NPOK-10	19C3	V. Diode Filter
C40	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C41	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C42	.1	200	162-0401	P288-1	DF-104	PTE4P1		2TM-P1	V. Amp. Screen †
C43	.2	200	162-0202	P488-22		GT4P2		2TM-P22	Video Coupling
C44	10000		168-0002N	SI10000	D6-103	PTE6S1	821-01	36C1	Pic. Tube Grid
C45	4-7		168-0008N	SI4.7NPO	TCZ-4.7	5R5Q5	NPOK-4.7	MS-55	S. IF Coupling
C46	10		168-0010P	SI10NPO	TCZ-10	5R5Q1	NPOK-10	19C3	Fixed Trimmer
C47A	4000		168-0003D	BPD-2X004	DD-2-502	1D5D4	822-2X004	36C2	1st S. IF Dec.
B	4000					1D5D4			1st S. IF Cath.
C48	50		166-0050N	SI50	D6-500	5W5Q5	GPIK-50	19C28	S. IF Coupling Note 1.
C48A	4000		168-0003D	BPD-2X004	DD-2-502	1D5D4	822-2X004	36C2	2nd S. IF Dec.
B	4000					1D5D4			2nd S. IF Cath. Note 1.
C50	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C51	250		166-0250P	SI250	D6-251	5W5T25	GP2K-250	1FM-325	Diode Load Cap.
C52	680	500	163-0680	SI680	D6-681	1W5T7	GP2K-680	19C17	De-emphasis
C53	10000		168-0002N	SI10000	D6-103	PTE6S1	821-01	36C1	Audio Coupling
C54	10000		"	SI10000	D6-103	PTE6S1	821-01	36C1	Tone Comp.
C55	10000		168-0002N	SI10000	D6-103	PTE6S1	821-01	36C1	Audio Coupling

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C56	100	500	163-0100	1468-0001	D6-101	5W5T1	GPIK-100	1FM-31	AF Amp. Plate
C57	10000		168-0002N	SI10000	D6-103	PTE6S1	821-01	36C1	Audio Coupling
C58	.005	600	162-0625	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Output Plate
C59	.047	200	160-02147	P268-047	DF-503	PTE4S5		2TM-S47	Sync. Coupling
C60	005	400	162-0625	P488-005	D6-502	PTE6D5	811-005	6TM-D5	Sync. Coupling
C61	10000		168-0002N	SI10000	D6-103	PTE6S1	821-01	36C1	Sync. Coupling
C62	.003	600	162-0623	P688-003	D6-302	PTE6D3	GP2M-003	6TM-D3	Sync. Sep. Cath.
C63A	2000		♦	P688-002	♦	PTE6D2	GP2M-002	6TM-D2	Integrator Net
B	5000			P688-005	PC-100	PTE6D5	811-005	6TM-D5	Integrator Net
C	5000			P688-005		PTE6D5	811-005	6TM-D5	Integrator Net
C64	750	500	163-0750	1468-00075	D6-751	1W5T8	GP2K-750	1FM-38	Vert. Osc. Grid
C65	.003	600	162-0623	P688-003	D6-302	PTE6D3	GP2M-003	6TM-D3	Vert. Osc. Grid
C66	.1	400	162-0401	P488-1		PTE4P1		4TM-P1	Vert. Discharge
C67	.1	400	162-0401	P488-1	DF-104	PTE4P1		4TM-P1	Vert. Sweep Coupling
C68	100	500	163-0100	1468-0001	D6-101	5W5T1	GPIK-100	1FM-31	Hor. Sync. Coupling
C69	.005	400	162-0625	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Fixed Trimmer
C70	.005	600	162-0625	P688-005	D6-502	PTE6D5	811-005	6TM-D5	AFC Filter †
C71	.1	200	162-0401	P388-1	DF-104	PTE4P1		2TM-P1	AFC Filter
C72	100	500	163-0100	1468-0001	D6-101	5W5T1	GPIK-100	1FM-31	Phase Shifter
C73	.015	400	169-0010	P488-015		PTE6S15		6TM-S15	Fixed Trimmer
C74	.002	600	162-0422S	P688-002	D6-202	PTE6D2	GP2M-002	6TM-D2	Hor. Osc. Grid
C75	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	RF Bypass
C76	.01	600	162-0611	P688-01	D6-103	PTE6S1	821-01	6TM-S1	Hor. Sweep Coupling
C77	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	29C1	Hor. Disch. Dec.
C78	680	500	163-0680	SI680	D6-681	1W5T7	GP2K-680	1FM-37	Hor. Discharge
C79	1000		166-1000P	SI1000	D6-102	1W5D1	GP2L-001	1FM-21	Hor. Sweep Coupling
C80	.047	600	162-0615	P688-047	DF-503	PTE6S5		6TM-S47	Hor. Output Screen
C81	.1	600	162-0601	P688-1		PTE6P1		6TM-P1	Damper Filter
C82	.03	600	162-0613	P688-03		PTE6S3		6TM-S3	Damper Filter
C83	.22	200	160-02022	P488-22		GT4P2		2TM-P22	Hor. Sweep Coupling
C84	1200	1000	174-1200						Fixed Trimmer
C85	.0005	10000	160-14350	P10088-0005		PTE100T5		TVM-351	Voltage Double Cap.
C86	.0005	10000	160-14350	P10088-0005		PTE100T5		TVM-351	H.V. Filter
C87	5000		166-5000D	BPD-006	DD-502	1D5D5	811-005	29C1	RF Bypass
C88	50		168-0050N	SI50	D6-500	5W5Q5	GPIK-50		2nd S. IF Grid Filter
C89	.68		168-0004P		TCZ-.68				IF Coupling Note 2.
C90	10		168-0010P	SI10NPO	TCZ-10		NPOK-10	19C3	Fixed Trimmer Note 2
C91	50		168-0009N	SI50NPO	TCZ-50	5R5Q5	NPOM-50		Fixed Trimmer Note 2.
C92A	4000		168-0003D	BPD-2X004	DD-2-502	1D5D4	822-2X004	36C2	Ratio Det.-AF Fil. Note 2
B	4000					1D5D4			Output Fil. Note 2.

* Some models use 29MMF in this application.
† Chassis 1-260, chassis 1-261 and chassis 1-366-66 use .005MFD in this application.
‡ Chassis 1-260, 1-261 COI use .01MFD in this application.
§ Items C63A, C63B, C63C, R72A, R72B and R72C are combined into one unit.
♦ Items C54 and R56 are combined into one unit. Obtainable under Mfgrs. part #190-0006.
Note 1. Not used in chassis 1-366-66.
Note 2. Used only in chassis 1-366-66.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SYLVANIA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	2Meg	½	157-0009	Concentrikit			
B	1Meg	½		BII-139 *			Brightness control - panel
C	Shaft End			BI3-137X *			Volume control - tapped@ 200KΩ - rear
D	Switch			E202 *			Attach per instructions in "Concentrikit"
R2A	1Meg	½	153-0009	78-1 *			Attach per instructions in "Concentrikit"
B	Shaft		Not req.	QII-137	AG-61-S	AN-69	AGC control
R3A	250Ω	2	153-0007	Not req.	FKS-1/4	AK-1	Attach to R2A per instructions
B	Shaft		Not req.	QII-130	AG-55-S	AN-50	Horizontal drive control
R4	250Ω	2	153-3007	Not req.	FKS-1/4	AK-1	Attach to R3A per instructions
R5A	5000	½	153-0010	WK-250	43-300	VK-123	Contrast control - wire wound
B	Shaft		Not req.	QII-114	AM-19-S	AN-10	Vert. linearity control
R6A	1Meg	½	153-0001	Not req.	FKS-1/4	AK-1	Attach to R5A per instructions
B	Shaft		Not req.	QII-137	AG-61-S	AN-69	Height control
R7A	1Meg	½	153-0001	Not req.	FKS-1/4	AK-1	Attach to R6A per instructions
B	Shaft		Not req.	QII-137	AG-61-S	AN-69	Vert. hold control
			Not req.	Not req.	FKS-1/4	AK-1	Attach to R7A per instructions

* Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SYLVANIA PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE STATED
R8	1500Ω	½		BTS-1500	Antenna Loading
R9	10KΩ 20%	½			RF Amp. Grid
R10	6800Ω 20%	½			RF Amp. Screen
R11	22KΩ 20%	½			Osc Grid
R12	10KΩ 20%	½			Osc Plate
R13	6Ω 20%	½			Parasitic Supp
R14	10KΩ	½			Mixer Grid
R15	100KΩ 20%	½			Mixer Grid
R16	10KΩ 20%	½			Mixer Plate
R17	1000Ω 20%	½	181-0102	BTS-1000	AGC Network - See Note 12
R18	3.3Meg	½	181-0335	BTS-3.3Meg	AGC Network
R19	3300Ω	½	181-0332	BTS-3300	1st Video IF Amp. Grid
R20	82Ω	½	181-0820	BTS-82	1st Video IF Amp. Cathode - See Note 7
R21	1000Ω 20%	½	181-0102	BTS-1000	AGC Network
R22	4700Ω	½	181-0472	BTS-4700	2nd Video IF Transformer Shunt
R23	82Ω	½	181-0820	BTS-82	2nd Video IF Amp. Cathode
R24	470Ω 20%	1	182-0471	BTA-470	Decoup
R25	1000Ω 20%	½	181-0102	BTS-1000	AGC Network
R26	22KΩ	½	181-0223		3rd Video IF Transformer Shunt - See Note 8
R27	82Ω	½	181-0820	BTS-82	3rd Video IF Amp. Cathode
R28	820Ω	½	181-0821	BTS-820	3rd Video IF Amp. Decoup -See Note 12
R29	33KΩ	½	181-0333		4th Video IF Transformer Shunt - See Note 9
R30	220Ω	½	181-0221	BTS-220	4th Video IF Amp. Cathode
R31	1000Ω 20%	½	181-0102	BTS-1000	4th Video IF Amp. Decoup
R32	5600Ω	½	181-0562		5th Video IF Transformer Shunt
R33	3900Ω 5%	½	181-03925	BTS-3900-5%	Video Det. Diode Load
R34	6800Ω 20%	½	181-0682	BTS-6800	AGC Network
R35	100KΩ	½	181-0104	BTS-100K	AGC Network
R36	10KΩ	½	181-0103	BTS-10K	AGC Load
R37	560KΩ 5%	½	181-05645	BTS-560K-5%	AGC Amp. Grid
R38	330KΩ 5%	½	181-03345	BTS-330K-5%	Voltage Divider
R39	2.2Meg	½	181-0225	BTS-2.2Meg	Voltage Divider

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SYLVANIA PART No.	IRC PART No.	IDENTIFICATION CODES
R40	100Ω 20%	½	181-0101	BTS-100	Bias Network
R41	15KΩ 20%	½	181-0153	BTS-15K	Video Peaking Coil Shunt
R42	150KΩ	½	181-0154	BTS-150K	Video Amp. Plate - See Note 1 and 2
R43	1Meg	1	182-0105	BTA-1Meg	Voltage Divider - See Note 3 and 4
R44	8200Ω	2	183-0822	BTB-8200	Voltage Divider
R45	7500Ω 5%	2	183-07525		Voltage Divider
R46	470KΩ 20%	½	181-0474	BTS-470K	Picture Tube Grid
R47	47KΩ 20%	½	181-0473		Sound IF Amp. Grid
R48	100Ω 20%	½	181-0101	BTS-100	Sound IF Amp. Cathode
R49	1000Ω 20%	½	181-0102	BTS-1000	Sound IF Amp. Decoup
R50	47KΩ	½	181-0473	BTS-47K	Trap Coil Shunt - See Note 12
R51	47KΩ 20%	½	181-0473	BTS-47K	Limiter Grid
R52	330Ω 20%	½	181-0331	BTS-330	Limiter Cathode
R53	22KΩ 20%	½	181-0223	BTS-22K	Limiter Decoup
R54	68KΩ	½	181-0683	BTS-68K	Ratio Det. Diode Load
R55	100KΩ 20%	½	181-0104	BTS-100K	De-emphasis
R56	47KΩ	½	190-0006 †	BTS-47K	Tone Compensation
R57	15Meg 20%	½	181-0156	BTS-15Meg	AF Amp. Grid
R58	220KΩ 20%	½	181-0224	BTS-220K	AF Amp. Plate
R59	470KΩ 20%	½	181-0474	BTS-470K	Output Grid
R60	270Ω	1	182-0271	BTA-270	Output Cathode
R61	470Ω 20%	2	183-0471	BTB-470	Output Decoup
R62	47Ω 5%	½	181-04705		Parasitic Supp
R63	470Ω 20%	½	181-0471	BTS-470	Voltage Divider
R64	10KΩ 20%	½	181-0103	BTS-10K	Isolation
R65	33KΩ	½	181-0333	BTS-33K	Sync. Sep. Plate
R66	10KΩ 20%	½	181-0103	BTS-10K	Isolation
R67	2.2Meg	½	181-0225	BTS-2.2Meg	Sync. Sep. Grid - See Note 10
R68	12KΩ	½	181-0123	BTS-12K	Sync. Sep. Plate
R69	1.2Meg	½	181-0125	BTS-1.2Meg	Sync. Amp. Grid - See Note 5
R70	33KΩ	1	182-0333	BTA-33K	Sync. Amp. Plate
R71	15KΩ	2	183-0153	BTB-15K	Sync. Amp. Plate
R72A	22KΩ	½	190-0007 †		Integrator
B	8200Ω	½			Integrator
C	8200Ω	½			Integrator
R73	1.5Meg	½	181-0155	BTS-1.5Meg	Vert. Osc. Grid - See Note 4
R74	470KΩ	½	181-0474	BTS-470K	Vert. Osc. Plate
R75	47KΩ 20%	½	181-0473	BTS-47K	Vert. Osc. Transformer Shunt
R76	100KΩ 20%	½	181-0104	BTS-100K	Decoup
R77	4700Ω 5%	½	181-04725	BTS-4700-5%	Vert. Peaking
R78	1Meg 20%	½	181-0105	BTS-1Meg	Vert. Output Grid
R79	680Ω 20%	½	181-0681	BTS-680	Vert. Output Cathode
R80	100KΩ	½	181-0104	BTS-100K	Horiz. Phase Discr. Diode Load
R81	100KΩ	½	181-0104	BTS-100K	Horiz. Phase Discr. Diode Load
R82	1Meg 20%	½	181-0105	BTS-1Meg	Horiz. Phase Discr. Diode Load
R83	470KΩ 20%	½	181-0474	BTS-470K	Horiz. AFC Filter
R84	8200Ω	½	181-0822	BTS-8200	Horiz. AFC Filter
R85	1000Ω 20%	½	181-0102	BTS-1000	Horiz. AFC Grid
R86	470KΩ 20%	½	181-0474	BTS-470K	Horiz. Osc. Grid
R87	22KΩ 20%	½	181-0223	BTS-22K	Horiz. Osc. Coil Shunt
R88	150KΩ 20%	½	181-0154	BTS-150K	Horiz. Disch. Grid
R89	82KΩ	½	181-0823	BTS-82K	Horiz. Disch. Plate
R90	4700Ω	½	181-0472	BTS-4700	Horiz. Peaking
R91	100KΩ 20%	½	181-0104		Parasitic Supp
R92	470KΩ 20%	½	181-0474	BTS-470K	Horiz. Output Grid
R93	150Ω	3	189-0020		Horiz. Output Cathode - Wire Wound
R94	8200Ω 5%	2	183-08225	BTB-8200-5%	Horiz. Output Screen
R95	100Ω 20%	½	181-0101		Parasitic Supp
R96	1.5Meg	2	189-0019		H.V. Rectifier Load
R97	1.5Meg	2	189-0019		H.V. Rectifier Load
R98	1000Ω 20%	½	181-0102	BTS-1000	Centering Network
R99	1000Ω 20%	1	182-0102	BTA-1000	Voltage Divider
R100	1000Ω 20%	½	181-0102	BTS-1000	Filter
R101A	3000Ω	15	189-0021		Voltage Divider - Wire Wound
B	12750				Voltage Divider - Wire Wound
R102	180Ω	2	183-0181	BW-2-180	Voltage Divider - Wire Wound
R103	47Ω 5%	½	181-04705	BW-½-47	Voltage Divider - See Note 6 and 11
R104	3300Ω	2	183-03325	BW-2-3300	Voltage Divider - See Note 12
R105	3600Ω	3	189-0023		Voltage Divider - Wire Wound
R106	4.3Ω	½	189-0007	BW-½-4.3	Filament String
R107	820Ω	½		BTS-820	1st Video IF Amp. Decoup - See Note 12
R108	2700	½		BTS-2700	Sound Trap Coil Shunt - See Note 12

† Items R56 and C54 are combined into one unit.
‡ Items R72A, R72B, R72C, C63A, C63B and C63C are combined into one unit.
Note 1. Some models use 39KΩ resistor in this application.
Note 2. Some models use 180KΩ resistor in this application.
Note 3. Some models use 270KΩ resistor in this application.
Note 4. Some models use 1.2Meg resistor in this application.
Note 5. Some models use 2.2Meg resistor in this application.
Note 6. Some models use 56Ω resistor in this application.
Note 7. Some models use 220Ω resistor in this application.
Note 8. Some models use 18KΩ resistor in this application.
Note 9. Some models use 27KΩ resistor in this application.
Note 10. Some models use 1Meg resistor in this application.
Note 11. Some models use 180Ω resistor in this application.
Note 12 Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC @ 2A	450VCT @ .300ADC	5V @ 3A	6.3V @ 4.2A SEC. 4 6.3V @ 6A	141-0013		P-3061	

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T2	6.3V @ 1.66A	6.3V @ 1.2A			240-0001		P-2945	FO-615

SYLVANIA MODELS 4120M, 4130B, E, M, W, 6110X, 6120B, M, W, 6130B, M, W, 7110X, 7120B, M, W, 7130B, M, W

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T3	170Ω	575Ω	242-0001	A-8111	A-3000	TB0-1	Vert. Block Osc. Horiz. Output
T4	126Ω	41Ω Tap 20Ω	241-0003				
	Tap 32Ω						
T5	870Ω		241-0004	A-8123	A-3037	TS0-5 ①	Vert. Output
	Tap 8.5Ω						
T6A	19Ω		100-0003				Horiz. Deflection Coil
B	50Ω						Vert. Deflection Coil

① Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T7	4.8KΩ	4.1Ω	530Ω	.7Ω	143-0014	A-3849 ④	A-3019	R0-9 ①	① Drill one new mtg. hole. ④ File out slots mount on orig. bracket.

SPEAKER

ITEM No.	RATINGS FIELD RES.	RATINGS V. C. IMP.	REPLACEMENT DATA SYLVANIA PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	PM	4.1Ω	539-0600 539-0801 ② 539-1002 ③			② Used in models 4130M, 4130W, 4130B ③ Used in models 6130W, 6130M, 6130B
	CONE DIA.	V. C. DIA.				
SP2	5 7/8	9/16				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.3A	41Ω	1.2 Henries	145-0004	C-2326 ①	C-2996 ①	TR-3300 ①	① Drill one new mounting hole.

COILS (RF-IF)

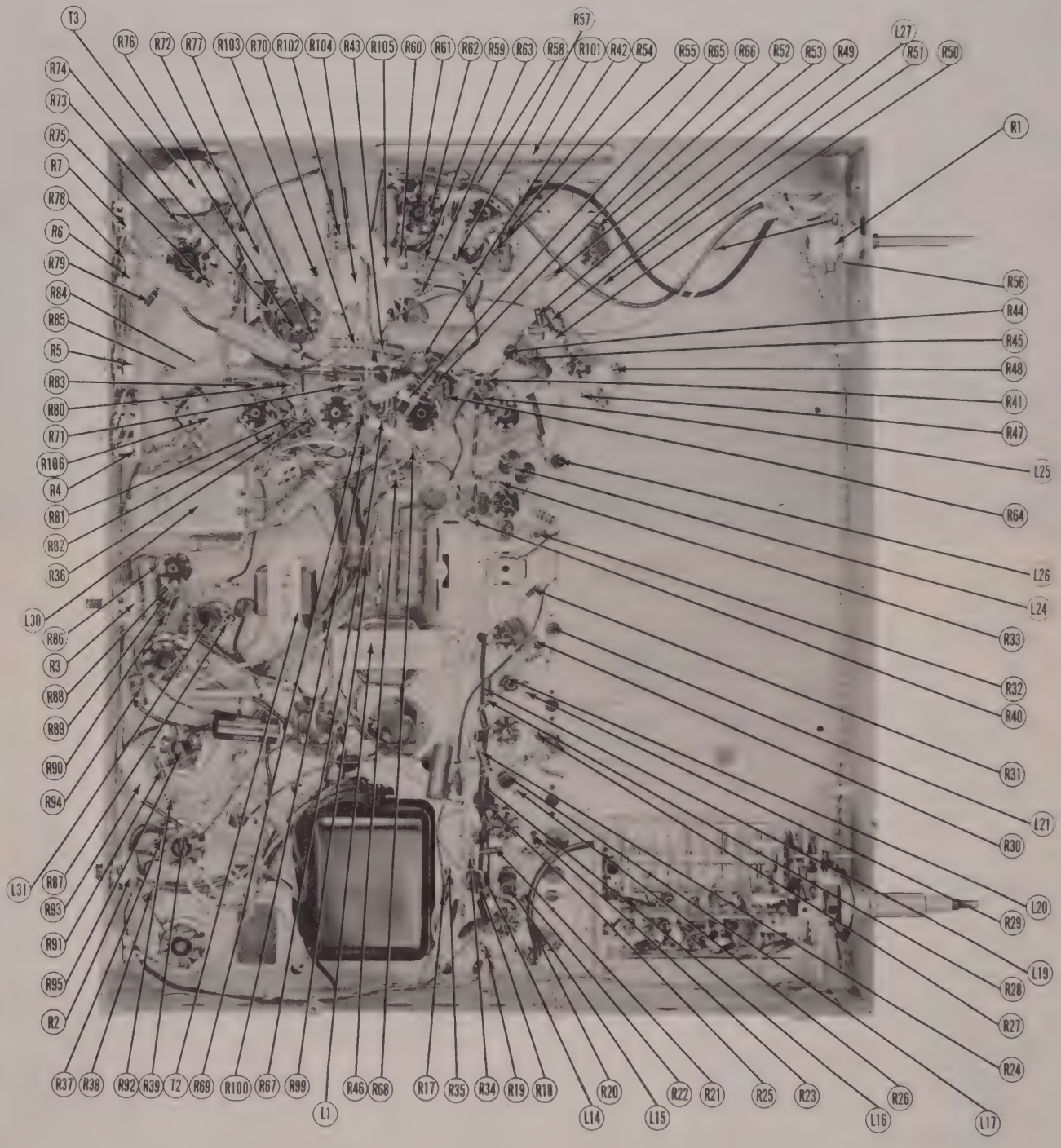
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA SYLVANIA PART No.	MEISSNER PART No.	NOTES
L2	Ant. Trans.	.1Ω	0Ω	*		
L3	Ant. Coil	0Ω		*		
L4	RF Choke	.1Ω		*		
L5	RF Coil Primary	0Ω		*		High Band
L6	RF Coil Secondary	0Ω		*		High Band
L7	RF Coil Primary	0Ω		*		Low Band
L8	RF Coil Secondary	0Ω		*		Low Band
L9	RF Coupling Coil	0Ω		*		Low Band
L10	Osc. Coil	0Ω		*		High Band
L11	Osc. Coil	0Ω		*		Low Band
L12	Fil. Choke	0Ω		*		
L13	1st Video IF	1.1Ω		*		
L14	Fil. Choke	0Ω		147-0014		
L15	2nd Video IF	.7Ω	.7Ω	125-0002		
L16	Fil. Choke	0Ω		147-0014		
L17	3rd Video IF	.7Ω	.7Ω	125-0002		
L18	Sound Trap			118-0007		Models 7110XF, 7120BF, 7120MF, 7120WF, 7130BF 7130MF, 7130WF
L19	Fil. Choke	0Ω		147-0014		
L20	4th Video IF	.7Ω	.7Ω	125-0002		
L21	Adj. Channel Sound Trap	.3Ω		118-0007		
L22	Sound Trap			118-0005		Models 7110XF, 7120BF, 7120MF, 7120WF, 7130BF, 7130MF, 7130WF
L23	5th Video IF	.6Ω	1.2Ω	120-0002		
L24A	Peaking	7.3Ω		131-2004		Blue Dot
B	Peaking	9.5Ω				Part of L24A
L25A	Peaking	5.7Ω		131-2003		Yellow Dot
B	Peaking	8.3Ω				Part of L25A
L26	1st Sound IF	6.2Ω		130-0001		
L27A	2nd Sound IF	3.7Ω		146-0012		
B	2nd Sound IF			120-0001		Alternate Part
L28	Ratio Det. Trans. Pri.	2.7Ω		128-0004		
L29	Ratio Det. Trans. Sec.	3.2Ω		128-0005		Tap at 1.7Ω
L30	Horiz. Phase Disc. Trans.	80Ω	40Ω	128-0006		
L31	Horiz. Osc. Coil	38Ω		146-0005		
L32	Horiz. Lin.	6.2Ω		133-0001		
L33	Horiz. Size	16Ω		132-0001		Measured with coil in parallel with horiz. output trans. winding.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA SYLVANIA PART No. FUSE	SYLVANIA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	REMARKS
M1	3AG	.250A	191-0005	487-0008	312.250	357001	

MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
M2A	RF Tuner	323-0003	Models 4120M, 4130M, 4130W, 4130B
B	RF Tuner	323-0002	Models 6120M, 6120W, 6120B, 6130M, 6130W, 7110XF, 7120BF, 7120MF, 7120WF, 7130BF, 7130WF, 7130MF
M3	Focus Magnet	400-0007	Includes centering adjustment
M4A	Ion Trap	400-0006	Models 4120M, 4130M, 4130B, 4130W, 6120M, 6120B, 6120W, 6130M, 6130B, 6130WB, 4130E, 6110X
B	Ion Trap	400-0009	Models 7110XF, 7120BF, 7120MF, 7120WF, 7130BF, 7130MF, 7130WF
	Safety Glass	710-0003	14 inch models 4120M, 4130M, 4130W, 4130B
	Safety Glass	710-0002	16 inch models 6120M, 6120W, 6120M, 6130W, 6130B
	Pointer Assembly	792-0004	Pointer Assembly
	Knob	740-0011	Tuning, Volume
	Knob	744-0011	Brightness
	Knob	743-0003	High-low band switch
	Knob	740-0012	Antenna (Models 4130M, 4130W, 4130B, 6120M, 6120W, 6120B)
	Knob	740-0013	Antenna (Models 6130W, 6130M, 6130B)



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PHOTOFACT* Folder

TELE-TONE MODELS

TV318, TV322, TV323 (CH. TAM)

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MODEL TV318

TELE-TONE MODELS
TV318, TV322, TV323 (CH. TAM)

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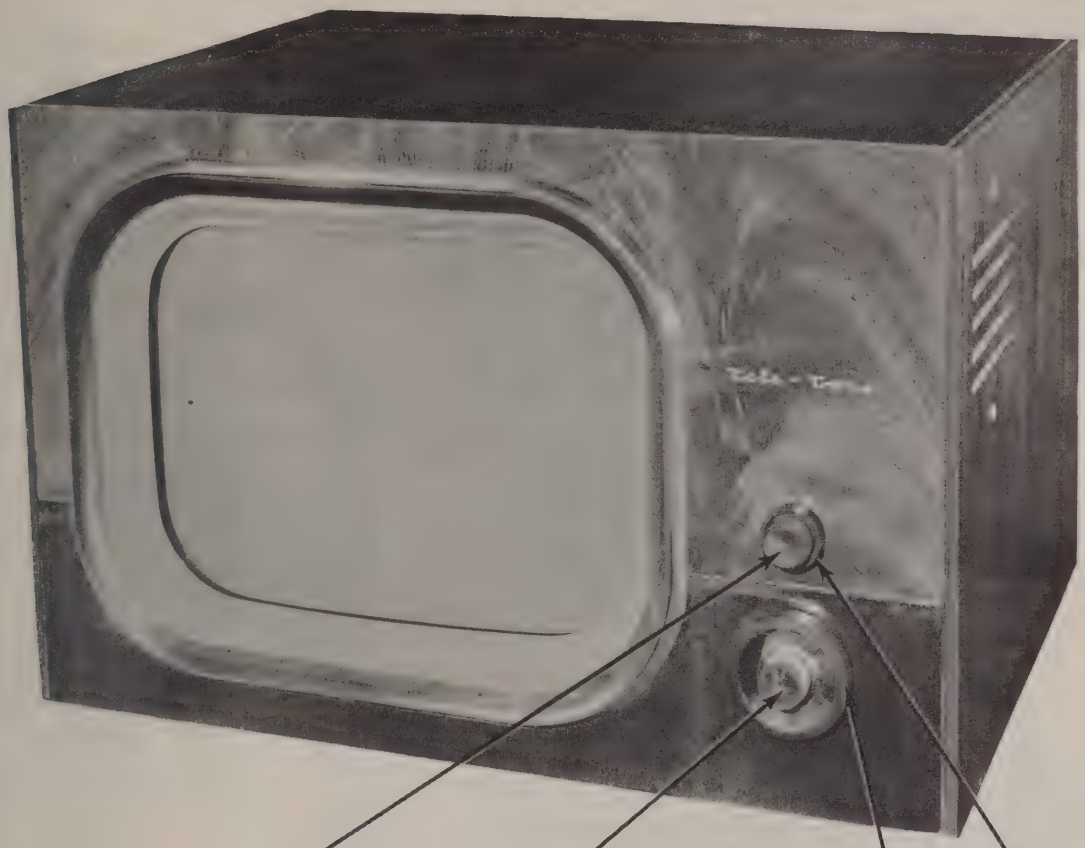

TELE-TONE MODELS
TV318, TV322, TV323 (Ch. TAM)

TELE-TONE MODEL TV318

TRADE NAME	Tele-Tone Models TV318, TV322, TV323 (Ch. "TAM")
MANUFACTURER	Tele-Tone Radio Corp., 540 W. 58th St., New York, New York
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	1.25 Amp. at 117 Volts AC
TUNING RANGE	Channels 2 thru 13

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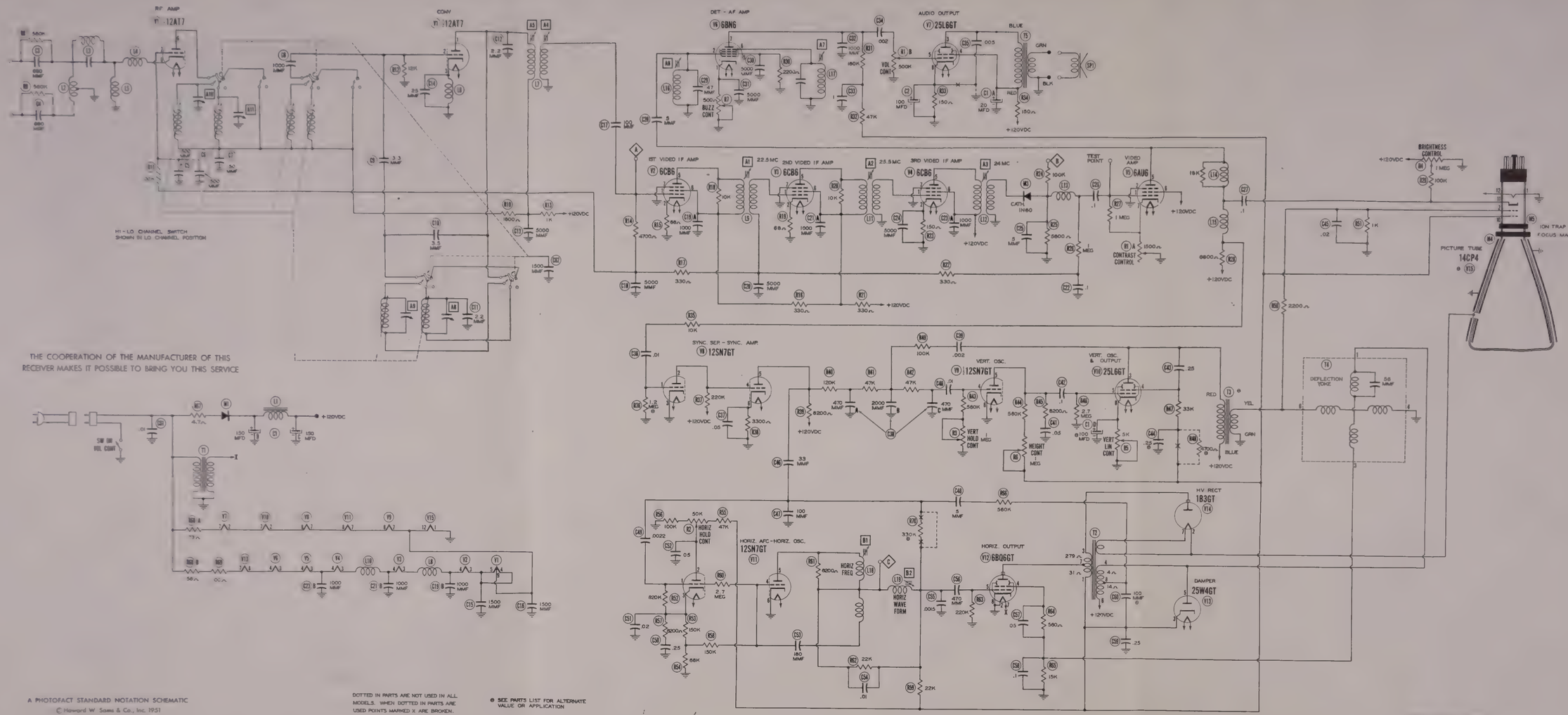

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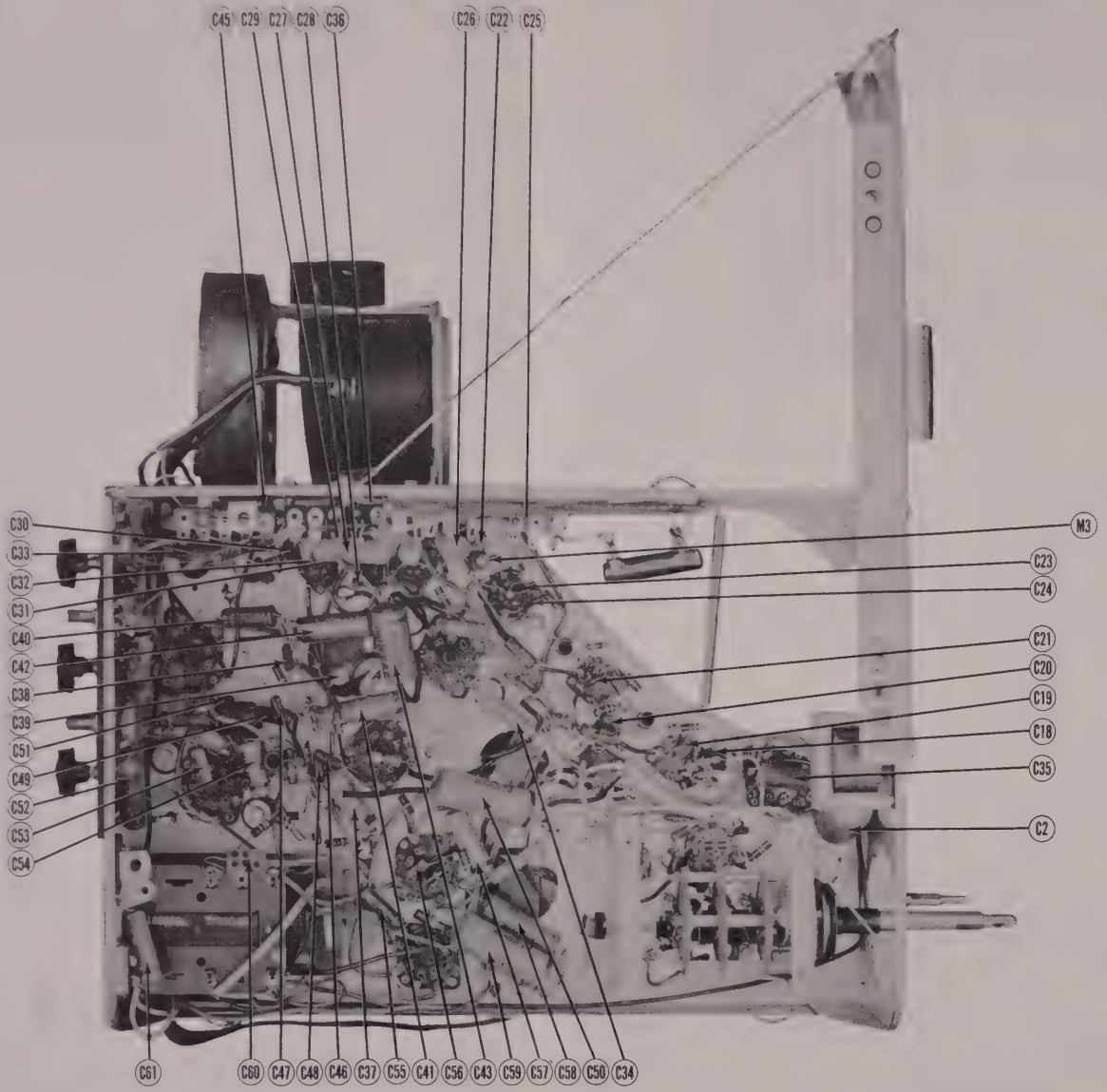
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

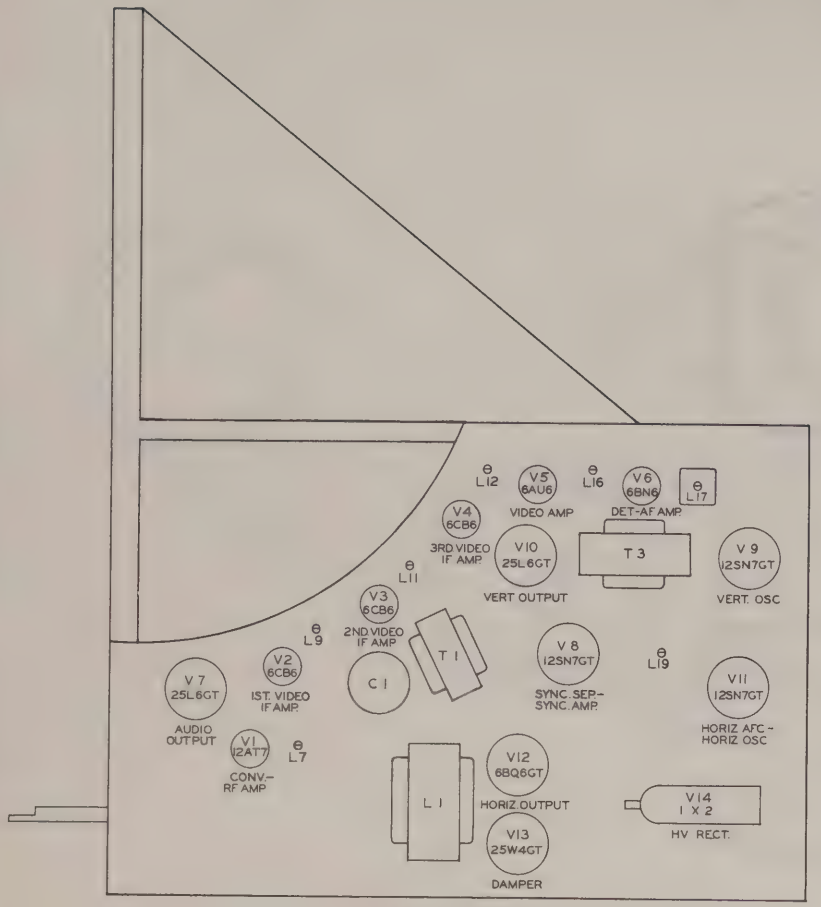
TELE-TONE MODELS
TV318, TV322, TV323 (Ch. TAM)

TELE-TONE MODELS
TV318, TV322, TV323 (Ch. TAM)

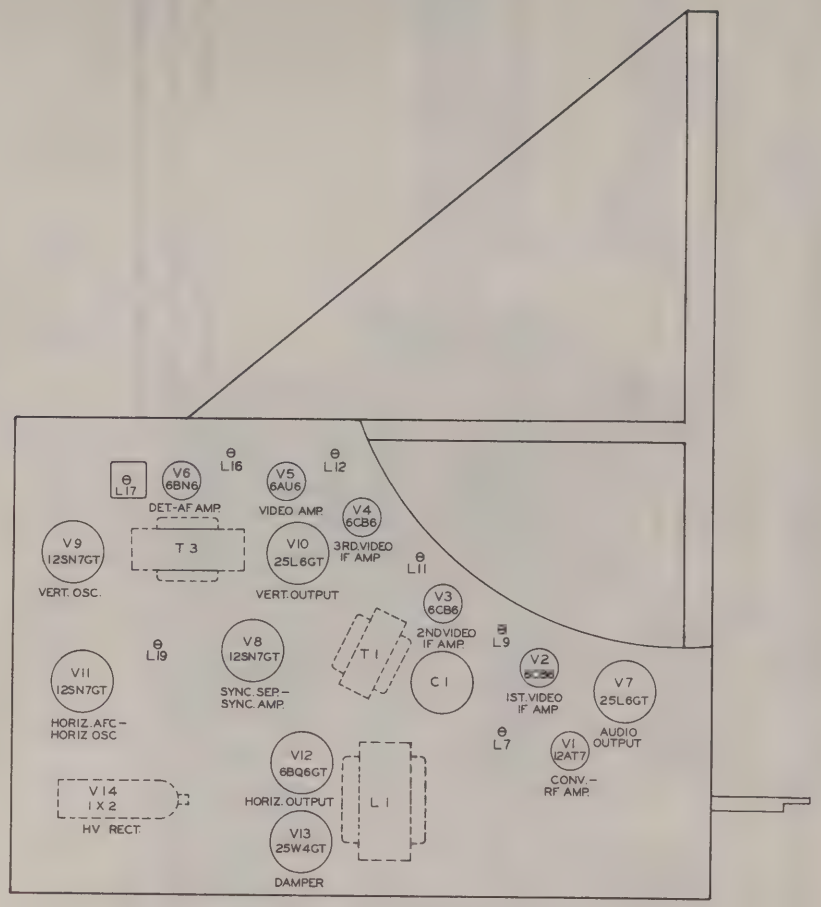
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION



TOP VIEW



BOTTOM VIEW

TUBE PLACEMENT CHART

TELE-TONE MODELS
TV318, TV322, TV323 (Ch. TAM)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to Point A. Low side to chassis.	Not used	22.5MC (Unmod.)	Tuning gang fully open	Use VTVM. DC Probe to Point (B). Common to chassis.	A1	Adjust for maximum deflection. Attenuate signal generator to maintain 4 volt reading.
2.	.001MFD	"	"	25.5MC	"	"	A2	"
3.	.001MFD	"	"	24MC	"	"	A3	"
4.	Direct	High side to ungrounded tube shield floating over RF Amp.-converter tube (V1). Low side to chassis.	24MC (10MC SWP)	21.25MC 25.75MC	Turn tuning gang to Point of non-interference	Vert. Amp. to Point (B). Low side to chassis.	A4, A5	Adjust for response curve similar to figure 1. If necessary retouch A1, A2, and A3 for proper response.

SOUND IF ALIGNMENT

Turn the set on and tune in a TV station. Adjust the tuning and contrast control for a normal picture.

Adjust the sound IF coil (A6) and the quadrature coil (A7) for maximum audio with best quality. Adjust the buzz eliminator control (R7) for minimum intercarrier buzz.

TUNER ALIGNMENT

There are 4 adjustments on the tuner.

1. High band oscillator trimmer (A8).
2. Low band oscillator trimmer (A9).
3. High band coupling adjustment (A10).
4. Low band coupling adjustment (A 11).

The plates of the tuning gang should not be bent for any adjustment.

The appropriate oscillator trimmer should be adjusted if any limit channel (2 or 6, 7 or 13) is found to be off the end of the tuning range. The opposite end channel should be checked to see that the oscillator is not tuned beyond its range.

The coupling may be adjusted on any channel by sweeping that channel with a sweep generator connected across the antenna terminals, and connecting an oscilloscope thru a detector network to point A.

If necessary the first IF transformer adjustments (A4 and A5) may be retouched slightly for proper response. The response curve should fall within the limits shown in figure 2.

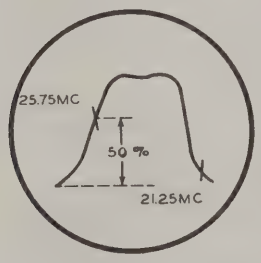


FIG. 1

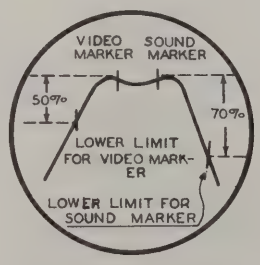
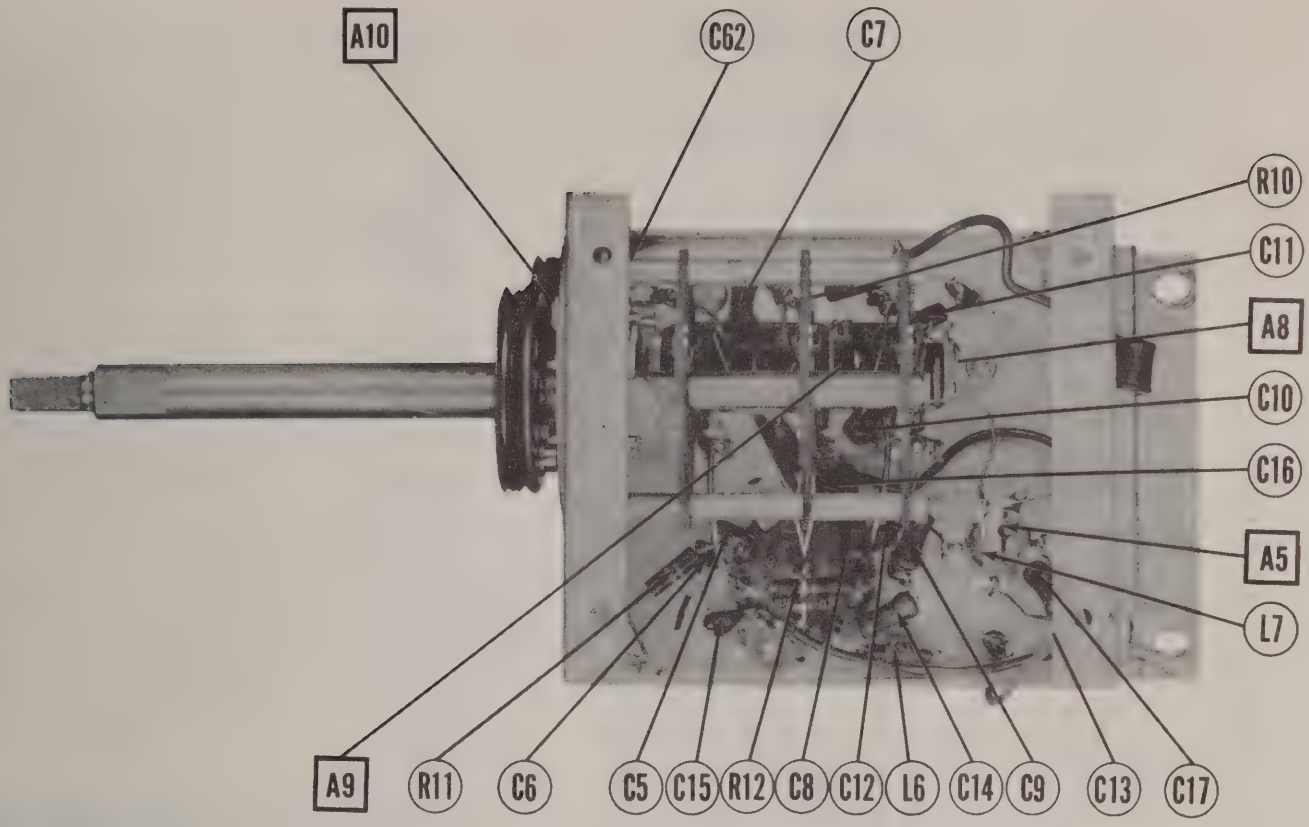
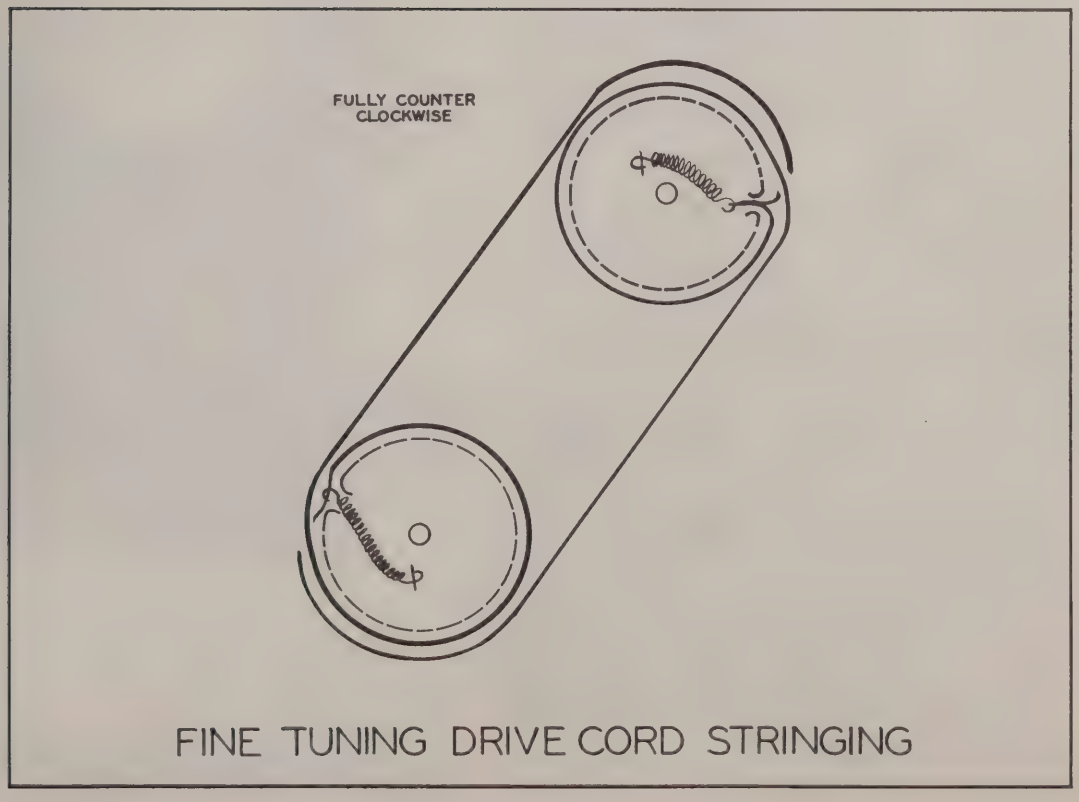


FIG. 2



RF TUNER



FINE TUNING DRIVE CORD STRINGING

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AT7	105VDC	§-1.5VDC	0V	12VAC	12VAC	100VDC	-.3VDC	0V	6VAC
V 2	6CB6	-.2VDC	.7VDC	12VAC	17VAC	110VDC	110VDC	0V		
V 3	6CB6	-.2VDC	.7VDC	17VAC	22VAC	115VDC	115VDC	0V		
V 4	6CB6	0V	1.4VDC	22VAC	27VAC	120VDC	120VDC	0V		
V 5	6AU6	.6VDC	0V	27VAC	33VAC	80VDC	120VDC	13VDC		
V 6	6BN6	6VDC 0V	0V	33VAC	40VAC	95VDC	0V	145VDC		
V 7	25L6GT	0V	65VAC	105VDC	115VDC	0V	0V	90VAC	8VDC	
V 8	12SN7GT	-.8VDC	17VDC	0V	17VDC	15VDC	17VDC	28VAC	40VAC	
V 9	12SN7GT	0V	0V	0V	-5.4VDC -6.4VDC	100VDC 55VDC	0V	6VAC	17VAC	
V 10	25L6GT	0V	40VAC	115VDC	145VDC	0V	225VDC	65VAC	30VDC 0V	
V 11	12SN7GT	-1.3VDC	170VDC 120VDC	8VDC	-45VDC	195VDC	0V	17VAC	28VAC	
V 12	6BQ6GT	195VDC	0V	120VDC	115VDC	-15VDC	120VAC	6.3VAC	0V	TOP CAP *
V 13	25W4GT	0V	0V	230VDC	0V	120VDC	0V	65VAC	40VAC	
V 14	1X2	* DO NOT MEASURE								
V 15	14CP4	0V	0V	PIN 10 230VDC	PIN 11 120VDC	0V	PIN 12 6VAC			

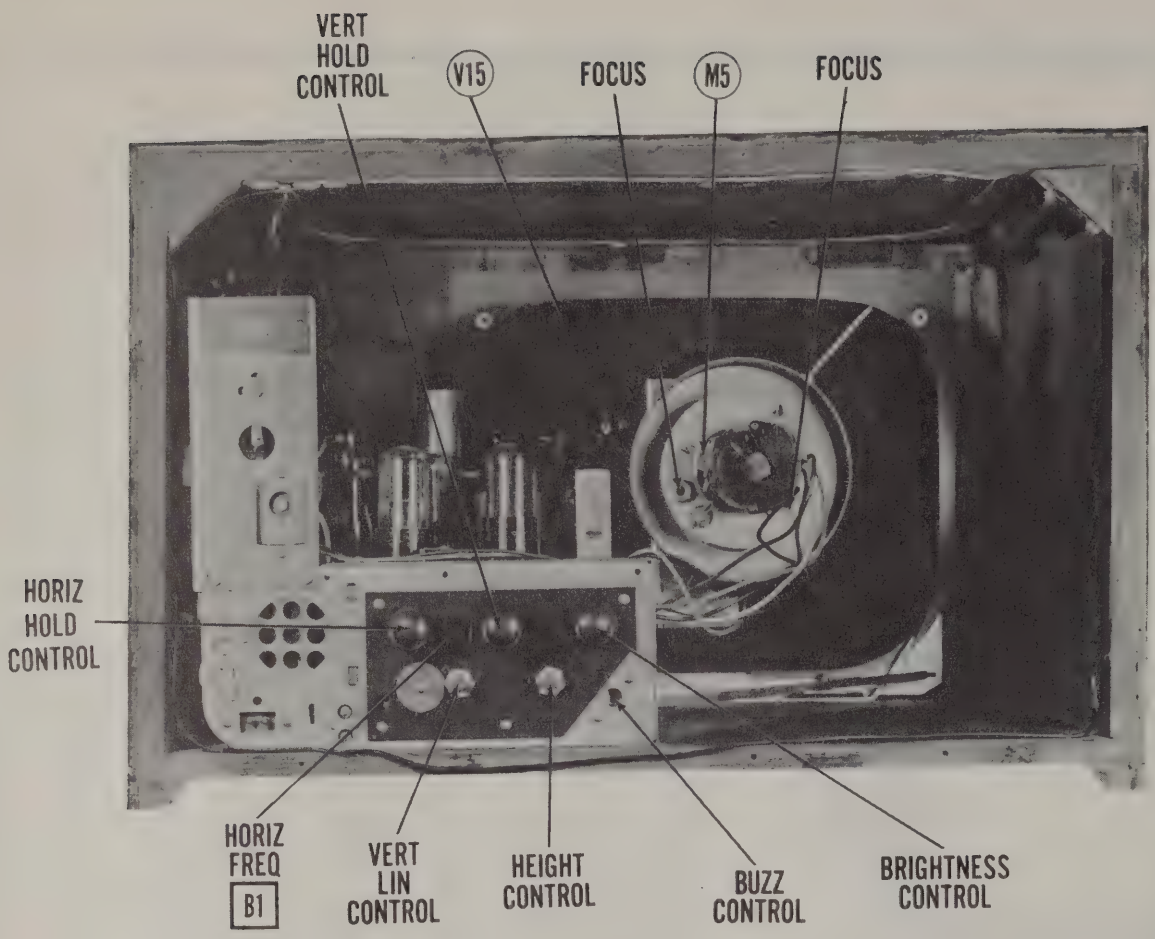
§ TAKEN WITH VACUUM TUBE VOLTMETER
* DO NOT MEASURE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AT7	†1KΩ	12KΩ	0Ω	11Ω	11Ω	†2.8KΩ	1.1Meg	0Ω	8Ω
V 2	6CB6	1Meg	68Ω	11Ω	14Ω	†660Ω	†660Ω	0Ω		
V 3	6CB6	1Meg	68Ω	17Ω	20Ω	†330Ω	†330Ω	0Ω		
V 4	6CB6	1Ω	150Ω	23Ω	26Ω	†10Ω	†9.5Ω	0Ω		
V 5	6AU6	1Meg	0Ω	26Ω	29Ω	†6.8KΩ	†9.5Ω	1.5KΩ		
V 6	6BN6	500Ω 10Ω	1.4Ω	29Ω	32Ω	†2.2KΩ	3.5Ω	#225KΩ		
V 7	25L6GT	Inf.	35Ω	†355Ω	†150Ω	20Ω	Inf.	40Ω	150Ω	
V 8	12SN7GT	1.2Meg	†220KΩ	0Ω	†220KΩ	†8.2KΩ	3.3KΩ	22Ω	28Ω	
V 9	12SN7GT	Inf.	Inf.	0Ω	560KΩ 1.5Meg	#560KΩ #1.5Meg	0Ω	8Ω	16Ω	
V 10	25L6GT	Inf.	28Ω	†1.1KΩ	#33KΩ	2.7Meg	#0Ω	35Ω	5KΩ 0Ω	
V 11	12SN7GT	850KΩ	#50KΩ # 100KΩ	220KΩ	220KΩ	#22KΩ	0Ω	16Ω	22Ω	
V 12	6BQ6GT	#22KΩ	0Ω	†9.5Ω	†600Ω	220KΩ	†25Ω	.4Ω	0Ω	TOP CAP #31Ω
V 13	25W4GT	Inf.	Inf.	220KΩ	Inf.	†28Ω	Inf.	40Ω	32Ω	
V 14	1X2	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP #310Ω
V 15	14CP4	0Ω	700Ω	PIN 10 #0Ω	PIN 11 370KΩ	100KΩ	PIN 12 8Ω			

† MEASURED FROM OUTPUT OF M1
# MEASURED FROM PIN 3 OF V13

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency adjustment (B1) to synchronize the picture horizontally.

Connect the vertical input of an oscilloscope between Point C and chassis.

Adjust the horizontal waveform adjustment (B2) until the broad and narrow peaks of the waveform on the scope are of equal height as shown in figure 3. If necessary during adjustment of B2, adjust B1 to keep the picture synchronized.

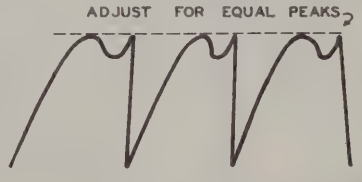
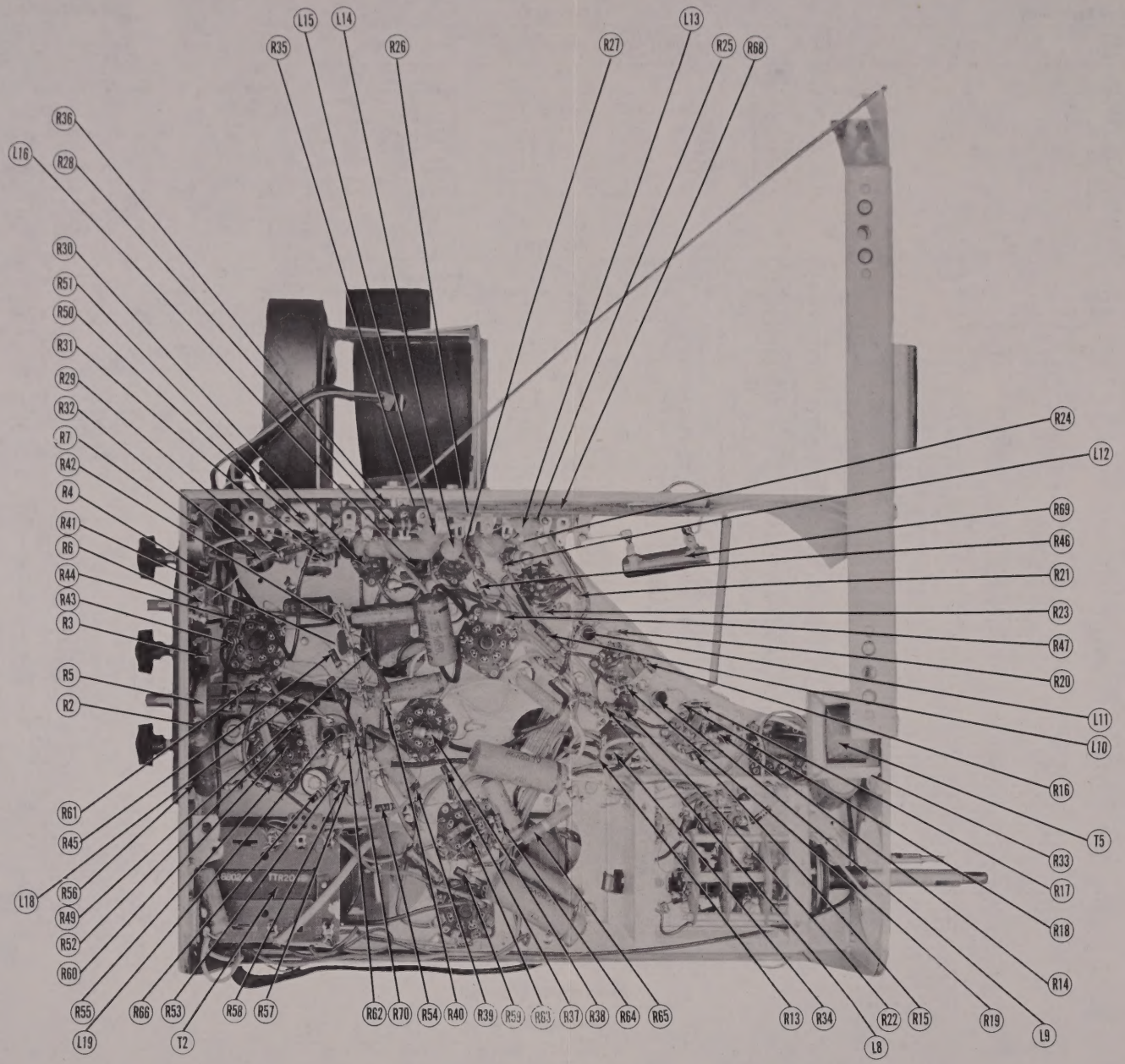


FIG. 3

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Disconnect built-in antenna.
3. Disconnect speaker leads.
4. Remove four 3/8" hex head bolts holding chassis in cabinet. Remove chassis.
5. Remove two 1/4" hex nuts securing speaker to cabinet. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TELETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.-Conv.	12AT7	12AT7	9A	
V2	1st Video IF Amp.	6CB6	6CB6	6CK	
V3	2nd Video IF Amp.	6CB6	6CB6	6CK	
V4	3rd Video IF Amp.	6CB6	6CB6	6CK	
V5	Video Amplifier	6AU6	6AU6	7BK	
V6	Det.-AF Amp.	6BN6	6BN6	7DF	
V7	Audio Output	25L6GT	25L6GT	7AC	
V8	Sync. Sep.- Sync. Amplifier	12SN7GT	12SN7GT	8BD	
V9	Vert. Oscillator	12SN7GT	12SN7GT	8BD	
V10	Vert. Output	35L6GT	35L6GT	7AC	
V11	Hor. AFC-Hor. Osc	12SN7GT	12SN7GT	8BD	
V12	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V13	Damper	25W4GT	25W4GT	4CG	
V14	HV Rectifier	1B3GT	1B3GT	3C	
V15A	Picture Tube	14CP4	14CP4	12D	
B	Picture Tube	14DP4	14DP4	12D	
C	Picture Tube	14HP4	14HP4	12D	
D	Picture Tube	14BP4	14BP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TELETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	20	300	TCE152-D	E4D386		UPT427			▲ Output Dec.
B	150	150							■ Filter
C	150	150							▲ Filter
D	100	30							Vert. Output Cath. †
C2	100	25		PRS25/100		BRH251A		TVA-1207	Output Cathode
C3	680	500		S1680	D6-681		GP2K-680	19C17	RF Coupling
C4	680	500		S1680	D6-681		GP2K-680	19C17	RF Coupling
C5	1500			BPD-0015	DD-152		801-0015	19C20	AGC Filter
C6	1500			BPD-0015	DD-152		801-0015	19C20	AGC Filter
C7	50			SI150	D6-500		GP1K-50	19C28	RF Amp. Dec.
C8	1000			SI1000	D6-102		GP2L-001	19C1	RF Coupling
C9	3.3			SI3.3NPO	TCZ-3.3		NPOK-3.3		Osc. Grid Cap.
C10	3.5								Fixed Trimmer
C11	2.2				TCZ-2.2				Fixed Trimmer
C12	2.2				TCZ-2.2				Fixed Trimmer
C13	5000			BPD-005	DD-502		811-005	29C1	RF Bypass
C14	25			SI25	D6-250		GP1K-25	19C27	Mixer Cathode
C15	1500			BPD-0015	DD-152		801-0015	19C20	RF Amp.-Conv. Fil.
C16	1500			BPD-0015	DD-152		801-0015	19C20	RF Amp.-Conv. Fil.
C17	100			SI100	D6-101		GP1K-100	19C11	IF Coupling
C18	5000		TCC502-SP	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C19A	1000			BPD-2X001	DD-2-102	1W5D1	812-2X001	29C7	1st V. IF Dec.
B	1000					1W5D1			1st V. IF Fil.
C20	5000		TCC502-SP	BPD-005	DD-502	1D5D5	811-005	29C1	AGC Filter
C21A	1000			BPD-2X001	DD-2-102	1W5D1	812-2X001	29C7	2nd V. IF Dec.
B	1000					1W5D1			2nd V. IF Fil.
C22	.1	200	TCP104-1	P288-1	DF-104	PTE4P1		2TM-P1	AGC Filter
C23A	1000			BPD-2X001	DD-2-102	1W5D1	812-2X001	29C7	3rd V. IF Dec.
B	1000					1W5D1			3rd V. IF Fil.
C24	5000		TCC502-SP	BPD-005	DD-502	1D5D5	811-005	29C1	3rd V. IF Cathode
C25	5	500	TCM050-7	1468-000005	TCZ-4.7	5W5V5	GP1K-5	MS-55	V. Diode Filter
C26	.1	200	TCP104-1	P288-1	DF-104	PTE4P1		2TM-P1	Video Coupling
C27	.1	200	TCP104-1	P288-1	DF-104	PTE4P1		2TM-P1	Video Coupling
C28	5	500	TCM050-7	1469-000005	TCZ-4.7	5R5V5	NPOK-5	MS-55	S. IF Coupling
C29	47			SI47NPO	TCZ-47		NPOM-47	29C14	Fixed Trimmer
C30	5000		TCC502-SP	BPD-005	DD-502	1D5D5	811-005	29C1	Det.-AF Amp. Screen
C31	5000		TCC502-SP	BPD-005	DD-502	1D5D5	811-005	29C1	Det.-AF Amp. Cathode
C32	1000		TCC102-SP	SI1000	D6-102	1W5D1	GP2L-001	19C1	AF Amp. Plate
C33	.1	400	TCPM104-4	P488-1	DF-104	PTE4P1		4TM-P1	AF Amp. Plate Dec.
C34	.002	1000	TCP202-10	P688-002	D6-202	PTE6D2	GP2M-002	6TM-D2	Audio Coupling
C35	.005	600	TCP502-10	P688-005	D6-502	PTE6D5	811-005	6TM-D5	Output Plate Bypass
C36	.01	400	TCP103-4	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Sync. Coupling
C37	.05	200	TCP503-1	P288-05	DF-503	PTE4S5		2TM-S5	Sync. Amp. Cathode
C38A	470		TCC583-D	SI470	D6-471	5W5T5	GP2K-470	19C15	Integrator Net
B	2000			BPD-002	D6-202	PTE6D2	GP2M-002	29C2	Integrator Net
C	470			SI470	D6-471	5W5T5	GP2K-470	19C15	Integrator Net
C39	.002	1000	TCP202-13	P1088-002		PTE18D2		MB-D2	Vert. Feedback
C40	.01	400	TCPM103-4	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Vert. Sync. Coupling
C41	.05	400	TCP503-4	P488-05		PTE4S5		4TM-S5	Vert. Discharge
C42	.1	400	TCPM104-4	P488-1	DF-104	PTE4P1		4TM-P1	Vert. Sweep Coupling
C43	.25	200	TCP254-0	P488-25		GT2P25		2TM-P25	Vert. Output Plate
C44	.25	400	TCP254-4	P488-25		GT4P25		4TM-P25	Vert. Output Screen *
C45	.02	200	TCP203-1	P488-02	DF-203	PTE4S2		2TM-S2	Pic. Tube Grid
C46	33	500	TCSM330-9		TCZ-33		NPOL-33	29C13	Hor. Sync. Coupling
C47	100	500	TCSM101-9	1469-0001	TCZ-100	5R5T1	NPOM-100	MS-31	Voltage Divider
C48	5	500	TCM050-7	1468-000005	TCZ-4.7	5W5V5	GP1K-5	MS-55	Horiz. Feedback
C49	.0022	600	TCPM202-10	P688-0022	D6-222	PTE6D2	GP2M-0022	6TM-D22	Hor. Sync. Coupling
C50	.25	400	TCP254-1	P488-25		GT4P25		4TM-P25	AFC Filter
C51	.02	200	TCP203-1	P488-02	DF-203	PTE4S2		2TM-S2	AFC Filter
C52	.05	400	TCP503-4	P488-05	DF-503	PTE4S5		4TM-S5	Horiz. AFC Plate
C53	180	500	TCM181-8	SI180	D6-181	5R5T2	GP2K-180	MS-32	Horiz. Osc. Grid
C54	.01	400	TCPM-103-4	P488-01		PTE4S1		4TM-S1	Fixed Trimmer
C55	.0015	600	TCPM105-11	P688-0015	D6-152	1W5D15	GP2L-0015	6TM-D15	Horiz. Discharge
C56	470		TCC471-SP	SI470	D6-471	5W5T5	GP2K-470	19C15	Horiz. Sweep Coupling
C57	.05	200	TCP503-1	P288-05	DF-503	PTE4S5		2TM-S5	Hor. Output Screen
C58	.1	200	TCP104-1	P288-1	DF-104	PTE4P1		2TM-P1	Hor. Output Screen
C59	.25	400	TCP254-4	P488-25		GT4P25		4TM-P25	Damper Filter
C60	100	1000	TCM101-14	1469-HV-0001					Fixed Trimmer †
C61	.01	400	TCPM103-4	P488-01	D6-103	PTE4S1	821-01	4TM-S1	Line Filter
C62	1500			BPD-0015	DD-152		801-0015	29C8	Switch Strut Bypass

* Not Used In Early Production Models.
† May Vary From 0 To 200MMF.
§ Some Models Use 10MFD In This Application. Mfgrs. Part # TCE105-D.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1500Ω	½	TVC-528-D		RTV-232		Contrast control - panel
B	500KΩ	½					Volume control and SW - rear
R2A	50KΩ	½	TVC-529-D	Q11-123	AG-44-S	B-31	Horiz. hold control
B	Shaft		Not req.	Not req.	FS-3	Not req.	Attach to R2A per instructions
R3A	1Meg	½	TVC-530-D	Q11-137	AG-61-S	B-69	Vert. hold control
B	Shaft		Not req.	Not req.	FS-3	Not req.	Attach to R3A per instructions
R4A	1Meg	½	TVC-530-D	Q11-137	AG-61-S	B-69	Brightness control
B	Shaft		Not req.	Not req.	FS-3	Not req.	Attach to R4A per instructions
R5A	5000Ω	½	TVC-537-D	Q11-114	AM-19-S	AN-10	Vert. linearity control
B	Shaft		Not req.	Not req.	RS-2	AK-1	Attach to R5A per instructions
R6A	1Meg	½	TVC-532-D	Q11-137	AG-61-S	AN-69	Height control
B	Shaft		Not req.	Not req.	RS-2	AK-1	Attach to R6A per instructions
R7	500Ω	1	TVC-531-D				Buzz control - wire wound

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELETONE PART No.	IRC PART No.	IDENTIFICATION CODES: ALL RESISTORS ± 10% UNLESS OTHERWISE STATED
R8	560KΩ 20%	½		BTS-560K	Antenna Isolation
R9	560KΩ 20%	½		BTS-560K	Antenna Isolation
R10	1800Ω	½		BTS-1800	RF Amp. Decoup
R11	100KΩ	½		BTS-100K	AGC Network
R12	12KΩ	½			Converter Grid
R13	1000Ω 20%	½	TRC-102-1		Decoup
R14	4700Ω	½	TRC-472-2	BTS-4700	1st Video IF Amp. Grid
R15	68Ω	½	TRC-680-2		1st Video IF Amp. Cathode
R16	330Ω 20%	½	TRC-331-1	BTS-330	1st Video IF Amp. Decoup
R17	330Ω 20%	½	TRC-331-1	BTS-330	AGC Network
R18	10KΩ	½	TRC-103-2		2nd Video IF Transformer Shunt
R19	68Ω	½	TRC-680-2		2nd Video IF Amp. Cathode
R20	10KΩ	½	TRC-103-2		3rd Video IF Transformer Shunt
R21	330Ω 20%	½	TRC-331-1	BTS-330	Decoup
R22	330Ω 20%	½	TRC-331-1	BTS-330	AGC Network
R23	150Ω	½	TRC-151-2	BTS-150	2nd Video IF Amp. Cathode
R24	100KΩ 20%	½	TRC-104-1	BTS-100K	Series Test Point
R25	5600Ω	½	TRC-562-2	BTS-5600	Video Det. Diode Load
R26	1Meg 20%	½	TRC-105-1	BTS-1Meg	AGC Network
R27	1Meg 20%	½	TRC-105-1	BTS-1Meg	Video Amp. Grid
R28	6800Ω	1	TRC-682-5	BTA-6800	Video Amp. Plate
R29	100KΩ 20%	½	TRC-104-1	BTS-100K	Picture Tube Cathode
R30	2200Ω	½	TRC-222-2	BTS-2200	AF Det.-Amp. Screen
R31	180KΩ 20%	½	TRC-184-1	BTS-180K	AF Amp. Plate
R32	47KΩ 20%	½	TRC-473-1	BTS-47K	AF Amp. Plate Decoup
R33	150Ω	½	TRC-151-2	BTS-150	Output Cathode
R34	150Ω	½	TRC-151-2	BTS-150	Output Decoup
R35	10KΩ 20%	½	TRC-103-1	BTS-10K	Isolation
R36	1.2Meg	½	TRC-125-2	BTS-1.2Meg	Sync. Sep. Grid - See Note 1
R37	220KΩ 20%	½	TRC-224-1	BTS-220K	Sync. Sep. Plate
R38	3300Ω	1	TRC-332-5	BTA-3300	Sync. Amp. Cathode
R39	8200Ω 20%	½	TRC-822-1	BTS-8200	Sync. Amp. Plate
R40	120KΩ 20%	½	TRC-124-1	BTS-120K	Integrator
R41	47KΩ 20%	½	TRC-473-1	BTS-47K	Integrator
R42	47KΩ 20%	½	TRC-473-1	BTS-47K	Integrator
R43	560KΩ	½	TRC-564-2	BTS-560K	Vert. Osc. Grid
R44	560KΩ	½	TRC-564-2	BTS-560K	Vert. Osc. Plate
R45	8200Ω 20%	½	TRC-822-1	BTS-8200	Vert. Peaking
R46	2.7Meg 20%	½	TRC-275-1	BTS-2.7Meg	Vert. Output Grid
R47	33KΩ	1		BTA-33K	Vert. Output Screen
R48	4700Ω	½	TRC-472-2	BTS-4700	Vert. Output Screen Decoup - See Note 2
R49	100KΩ 20%	½	TRC-104-1	BTS-100K	Vert. Feedback
R50	2200Ω	½	TRC-222-2	BTS-2200	Picture Tube Grid
R51	1000Ω 20%	½	TRC-102-1	BTS-1000	Vert. Output Transformer Shunt
R52	820KΩ	½	TRC-824-2	BTS-820K	Horiz. AFC Grid
R53	150KΩ	½	TRC-154-2	BTS-150K	Horiz. AFC Cathode
R54	68KΩ	½	TRC-683-2	BTS-68K	Bias Network
R55	47KΩ	½	TRC-473-2	BTS-47K	Horiz. AFC Plate
R56	100KΩ	½	TRC-104-2	BTS-100K	Voltage Divider
R57	8200Ω	½	TRC-822-2	BTS-8200	Horiz. AFC Filter
R58	150KΩ	½	TRC-154-2	BTS-150K	Horiz. Osc. Grid
R59	22KΩ	½	TRC-333-2	BTS-22K	Horiz. Osc. Plate
R60	2.7Meg 20%	½	TRC-275-1	BTS-2.7Meg	Horiz. Osc. Feedback
R61	8200 20%	½	TRC-822-1	BTS-8200	Horiz. Osc. Transformer Shunt
R62	22KΩ	½	TRC-223-2	BTS-22K	Horiz. Stabilizing Transformer Shunt
R63	220KΩ 20%	½	TRC-224-1	BTS-220K	Horiz. Output Grid
R64	560Ω	2	TRC-561-2	BTS-560	Horiz. Output Screen
R65	15KΩ	2	TRC-153-8	BTB-15K	Voltage Divider
R66	560KΩ	½	TRC-564-2	BTS-560K	Horiz. Feedback
R67	4.7Ω	2	TRC-47A-8		Rectifier Ballast
R68A	73Ω	10	TRP-20D		Filament Dropping - Wire Wound
B	58Ω	10			Filament Dropping - Wire Wound
R69	100Ω	10	TRP-25	1 3/4A-100	Filament Dropping - Wire Wound
R70	330KΩ	½		BTS-330K	Horiz. Feedback Network - See Note 3

Note 1. Some Models Use 820KΩ Resistor In This Application.
Note 2. Used In Late Production Models Only.
Note 3. Not Used In All Models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: TELETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	6.3V			TTR222-D	P6134 ①	P-3074	FO-615
	②.065A	①1.2A						

① Drill one new mounting hole.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: TELETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	310Ω tap 31Ω	18Ω tap 14Ω	TTR204-D		HV0-6		Horiz. Output
T3	1100Ω	10Ω	TTR185-D ②	A-8112	A-3036	TSO-5 ①	Vert. Output
T4A	17Ω		TTR20-5D				Horiz. Deflection Coil
B	75Ω						Vert. Deflection Coil

① Drill one new mounting hole.
② Some models use alternate part # TTR203-D.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TELETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T5	2.7KΩ	4.2Ω	205Ω	1.1Ω	TTR195-2D	A-3332 ①	A-2928	RO-2	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: FIELD RES.	RATINGS: V. C. IMP.	REPLACEMENT DATA: TELETONE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	PM	4.2Ω	TSP467	ST-113 Mod. P4-X	4A1	
	CONE DIA.	V. C. DIA.				
SP2	4"	9/16				

FILTER CHOKE

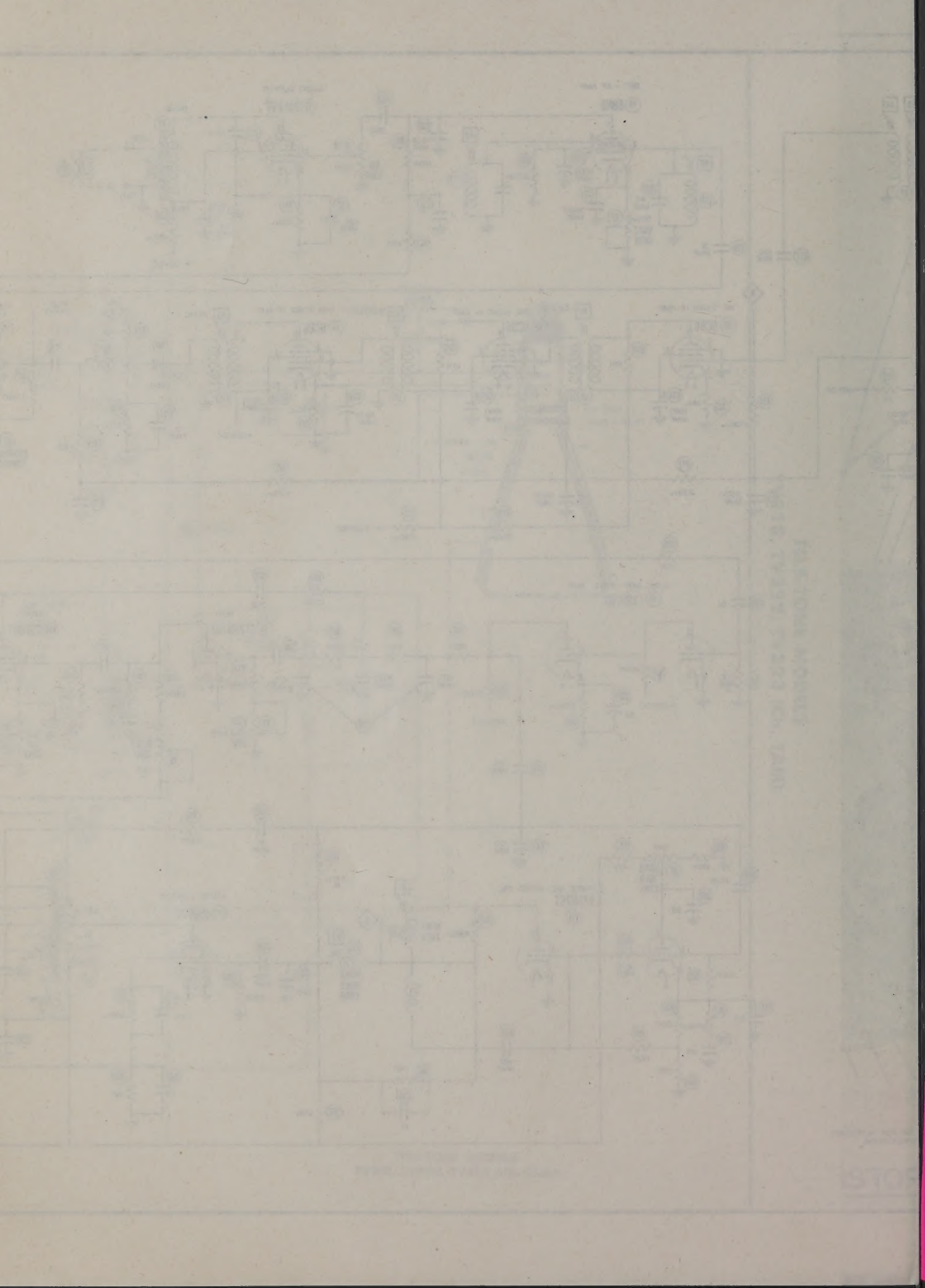
ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ω)	REPLACEMENT DATA: TELETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	250MA	9.5Ω	.4 Henry	TTR202-D		C-2974	TR-3300 ①	① Drill one new mtg. hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TELETONE PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L2	Ant. Coil	0Ω					
L3	IF Trap	0Ω					Wound on 25MMF Capacitor
L4	Ant. Coil	0Ω					
L5	Ant. Coil Shunt	0Ω					
L6	Cathode Choke	0Ω					
L7	1st Video IF	.2Ω	.4Ω				
L8	Fil. Choke	3Ω		TLF140-D		CLA	3.3 Microhenries
L9	2nd Video IF	1Ω	1Ω	TLF575-D			
L10	Fil. Choke	3Ω		TLF140-D		CLA	3.3 Microhenries
L11	3rd Video IF	1Ω	1Ω	TLF574-D			
L12	4th Video IF	1Ω	1Ω	TLF576-D			
L13	Peaking	3.3Ω		TLF535-D			Purple Dot
L14	Peaking	6.8Ω		TLF526-D			Wound on 18KΩ Resistor
L15	Peaking	13Ω		TLF573-D			Yellow Dot
L16	Sound IF	1.4Ω		TLF579-D			
L17	Quadrature Coil	3.5Ω		TLF557-D			
L18	Horiz. Osc. Coil	138Ω		TLF580-D			Tap at 42Ω
L19	Horiz. Wave-form Coil	30Ω		TLF581-D			

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: TELETONE PART No.	SYLVANIA PART No.	SELETRON PART No.	NOTES
M1	250MA	TSR106-D	NF5	6082	

MISCELLANEOUS

ITEM No.	PART NAME	TELETONE PART No.	NOTES
M2	RF Tuner		
M3A	Crystal	IN-60	Video Det.- IN-60
B	Crystal	IN-64	Video Det. - IN-64
M4A	Focus Magnet	TPM101-DA	
B	Focus Magnet	TPM103-D	
M5A	Ion Trap	TLF583-ID	Used with 14CP4 Tube
B	Ion Trap	TLF583-D	Used With 14BP4, 14DP4, 14HP4 Tubes
	Safety Glass	TGLI63-D	Models TV-318
	Safety Glass	TGLI64-D	Models TV-322, TV-323
	Escutcheon	TMSI041-DS	Models TV-318, TV-323
	Escutcheon	TMSI041-D	Model TV-322
	Knob	TKN253-D	Band Switch
	Knob	TKN264-DS	Fine Tuning Models TV-318, TV-323
	Knob	TKN264-D	Fine Tuning Model TV-322
	Knob	TKN-256-D	Contrast
	Knob	TKN-252-D	Volume